THE *Soybean Digest*

REG. U. S. PAT. OFF.
HUDSON, IOWA

Business, publication and circulation offices, Hudson, Iowa. Editor, Geo. M. Strayer. Managing Editor, Kent Pellett. Business Manager, Geo. McCulley. Director of Circulation, Gene Taylor.

Advertising representatives: Ewing Hutchison Co., 35 E. Wacker Drive, Chicago 1, Ill.

Vol. 8 **MARCH ☆ 1948** **No. 5**

Published on the 15th of each month at Hudson, Iowa, by the American Soybean Association. Entered as second class matter November 20, 1940, at the postoffice at Hudson, Iowa, under the Act of March 3, 1879. Forms close on 1st of month. Subscription price to association members, $1.50 per year; to non-members, $2.00 per year; Canada and other members of the Pan-American Union, $2.50; other foreign, $3.00.

IN THIS ISSUE

EDITOR'S DESK

Need to Act for Exports

A radical change is now under way in the livestock and feed picture. A supply of vegetable proteins is being built up that may soon become a burdensome surplus. Prices quoted on soybean oil meal for future delivery already reflect the belief that as grass becomes available meal warehouses will fill up rapidly.

Officers of the American Soybean Association believe the government should immediately grant substantial export allocations of soybean oil meal—or else place proteins on the free list to remove the threat of a surplus.

Reasons for the increase in protein supplies are plain. The U. S. livestock population is now the smallest in 9 years, according to Department of Agriculture figures. A reliable estimate indicates that livestock numbers will decline still further, to 130 million grain-consuming units between now and next January 1.

Due to high meat prices livestock is being fed protein concentrates more heavily than at any time in the past 11 years. But in spite of this, it is estimated that we will have a national EXPORTABLE SURPLUS OF 322,000 TONS OF PROTEIN MEALS THIS YEAR.

In the next crop year the expected surplus will be much greater. This belief is based on an increase of 6 percent in the cotton crop, and U. S. Department of Agriculture acreage goals calling for larger oilseed production in 1948 than in 1947.

If per-acre yields are no greater in 1948 than they were in 1947—far from a record year—total oil meal production will still be somewhat above this past crop year. And there will be an estimated EXPORT SURPLUS OF ALMOST 1 MILLION TONS! Such a surplus, unless it is allowed to find markets abroad freely, is certain to have a demoralizing effect on the soybean as well as the meal market. It is certain to result in a declining soybean acreage—at a time when the nation's interest demands that that acreage be kept up.

Fats and oils will remain in short supply for another year. For this reason, USDA is asking for a national soybean acreage in 1948 somewhat above the actual acreage harvested in 1947.

Such a goal will not be realized if the price of soybeans should nose dive between now and planting time. Growers will be looking for more profitable crops. There is a definite trend right now toward larger corn acreage and smaller soybean acreage, especially in the western part of the Cornbelt.

To invite the needed confidence in the soybean crop for the 1948 crop year that will stimulate growers to maintain or increase the acreage over last year, we recommend that the feeds branch of Production and Marketing Administration grant immediate substantial export allocations of soybean oil meal or other protein meals.

Or the agency should place protein meals on the free list. This would permit the soybean industry to seek normal markets in an outside world that is still protein-hungry for any surpluses that may develop.

Meet that Great Explorer ...the Multiwall Paper Bag!

Here's a way of packaging that's not confined to products where bags are taken for granted. St. Regis Multiwalls branch out, move into all sorts of new fields! They adapt themselves to all sorts of products where you might not think of *paper* as the standard container.

And wherever multiwalls go, they offer more economical, more efficient, and more sanitary packaging.

If you have a product that could conceivably be packaged in multiwall paper bags — anywhere up to 100 pounds — talk it over with one of our offices. They will tell you about differences in construction and closures. They will tell you, too, about specially designed bag filling equipment.

Over 400 products are now using multiwalls — and the end is nowhere in sight!

SALES SUBSIDIARY OF ST. REGIS PAPER COMPANY

ST. REGIS SALES CORPORATION
230 PARK AVENUE • NEW YORK 17, N. Y.

NEW YORK 17: 230 Park Ave. • CHICAGO 1: 230 No. Michigan Ave. • BALTIMORE 2: 1925 O'Sullivan Bldg. SAN FRANCISCO 4: 1 Montgomery St. • ALLENTOWN, PA.: 842 Hamilton St. • OFFICES IN OTHER PRINCIPAL CITIES—IN CANADA: ST. REGIS PAPER CO. (CAN.) LTD., MONTREAL • HAMILTON • VANCOUVER

ST. REGIS PACKAGING SYSTEMS

Testing Seed Will Pay Off Testing seed before planting is a wise practice any year. It will be especially wise to test soybean seed before planting this spring, if it comes from areas that were dry or otherwise abnormal when beans ripened last fall.

Much of Iowa was in this area, and Iowa seed so far tested has shown very uneven germination. Report of the tests at the Iowa State College Seed Laboratory by E. P. Sylvester, acting head, was carried in the February *Digest*. A report from the seed laboratory at Des Moines states that there has been a wide variation in viability of soybean seed received there—from 26 to 89 percent—and an unusual percentage of hard seed.

Reports from some other sections are too meager for us to know whether seed elsewhere is showing unusually low germination. A report from the Minnesota seed testing laboratory indicates poor germination there; from Illinois and Indiana reports are that germination is better than usual.

Whatever the general situation may be in your state, you will do well to test your seed before planting time. If you know in advance that the percentage of germination will be low, you can up the planting rate.

Processors Included The Bureau of Census of the Department of Commerce is charged with the responsibility of making an annual report on the activities of all types of manufacturers. Included are various types of information required from all oilseed crushers.

Processors of soybeans are included in that census. They are required, by law, to make a full report on forms supplied by the Bureau of the Census within 30 days after receipt of those forms. The accumulated total figures are then used in the published reports on oilseed crushing in the United States. Processing plants are urged to cooperate willingly in this census project, as it is required by law, and because the figures are then made available as totals and indicate very clearly the trends in production, together with stocks of vegetable and animal oils.

1948 Soybean Blue Book The 1948 edition of the *Soybean Blue Book* is now off the press and in the process of being mailed. If your copy has not reached you by this time it should be in your hands in a few days.

Much work went into compiling this edition in an effort to include as much statistical information on soybeans and the soybean industry as the space at our disposal would allow.

We hope you find the 1948 edition useful.

Margarine Hearings Hearings on proposed margarine legislation were being held before the committee on agriculture of the U. S. House of Representatives in Washington just as the *Soybean Digest* went to press. Four or five representatives of the American Soybean Association testified in favor of H. R. 5292 which would repeal the 10-cents-per-pound tax on margarine made from domestically produced fats and oils. Perhaps you will know by the time the *Digest* reaches you whether the hearings will result in a margarine bill being voted out of committee.

GROWERS

Mexico, Mo., Contest

Frank Brakel, Laddonia, became permanent winner of the Audrain County, Mo., soybean cup this year.

Award was made at the annual soybean meeting at Mexico, Mo., in January, reports County Extension Agent John W. McClure. Brakel's yield was 20.6 bushels per acre. This was the second time he had won the cup.

The program in Audrain County has been sponsored for the past 5 years by the extension service, the G. M. & O. Railroad, the Audrain County Farm Bureau and the M. F. A. Cooperative Grain & Feed Co., of Mexico, Mo.

The contest is divided into classes A and B. Class A is for soybeans grown on limed soil; class B, on unlimed soil.

Class A winner was John Schindler of Sturgeon, with a yield of 18.8 bushels. Class B was won by Ralph Ogle of Centralia. His yield was 12 bushels per acre.

Lapel buttons were awarded to the following men who were high in their respective classes:

Class A: Lyndall Craghead, Fairchild Bros., W. H. Holtcamp, W. R. Brown, C. L. Erisman, Ted Stansberry, Carver Brown, Fred Dobelin, Floyd Chrisman, and Wm. T. Nation.

Class B: Ralph Ogle, Clayton Brown, Carl Mongler, Mayo Moore and Coy Wilson.

In addition to yield, points were awarded for such practices as fertilizing, inoculating, growing approved varieties and sowing cover crops after the beans have been harvested.

Yields were low in Audrain County in 1947, due to a drought somewhat comparable to that of 1936.

"This soybean program is designed primarily for the purpose of obtaining information to guide us in making recommendations for soybean production in Audrain County," reports McClure.

"We have found that it is definitely best to grow soybeans on limed ground, as indicated by our tests and experience. Five years ago rarely was a field of beans planted on land that had been limed. This year only about 10 percent of the beans were planted on unlimed ground.

John Schindler, Class A winner in Audrain County, Mo., soybean yield contest.

"It is doubtful that fertilizer pays in the production of soybeans. However, there has been an increase in yield of 5 bushels per acre when fertilizer was used with beans, particularly on limed soils.

"The Chief variety has proved most profitable to farmers in the county. It yields from 1 to 5 bushels per acre over other varieties grown.

"Our time-of-planting indicated that from June 1 to 15 yields a larger return per acre than other planting dates.

"Many farmers have found a value in cover crops. For example, after soybeans are removed wheat is drilled in the fields. In many cases it is drilled immediately after

combining without any further seed preparation and from 20 to 30 bushels of wheat harvested in the spring. The wheat, of course, is fertilized, generally with a fertilizer containing complete analysis.

"So the whole program is a program of obtaining information. The contest adds enthusiasm and interest. The primary reason is to find out what makes soybeans yield the highest number of bushels per acre and in turn make soybeans a permanent crop in Audrain County."

Soybeans in New Jersey

Soybeans need ample fertilizers and lime in New Jersey, advises the New Jersey Experiment Station. This crop will tolerate more acid conditions than alfalfa or red clover. For the best growth and the most efficient utilization of fertilizers, however, the pH should be maintained at about 6.5.

Where soybeans are to follow a well-manured or fertilized crop in New Jersey, superphosphate should be used at the rate of 200 pounds per arce. On soil that has not been manured or heavily fertilized during the preceding year, an 0-14-7 or an 0-12-12 fertilizer should be applied at the rate of 200 to 500 pounds per acre.

Fertilizer in amounts higher than 200 pounds per acre should be plowed down or applied deeply with a disk drill after plowing. Drilling heavy amounts of fertilizer with the seed may cause injury and there is also a possibility of destroying the inoculant.

In Mississippi

Farmers in Tunica county, Miss., are planning to plant 25,000 or more acres in soybeans this year, according to County Agent H. J. Vickery of Tunica.

"They recognize that more than 40,000 acres of their soil are better adapted to producing soybeans than cotton," Vickery declared. He pointed out that soybeans are proving to be excellent in rotation with cotton. "Two years soybeans and two years cotton on black land produces more cotton than four years straight cotton," he said.

Grower Meetings

A series of conferences with farmers and soybean growers of the Scott, Ark., area is being held by L. M. Humphrey, chief plant breeder of the Robert L. Dortch Seed Farms, at his office, during February and March.

Subjects under discussion at the meetings include varietal adaptation and breeding; soils and fertilizers; planting and cultural practices; and harvesting and storage of soybeans.

LETTERS TO THE EDITOR

Answers Sharbrough

To The Editor:

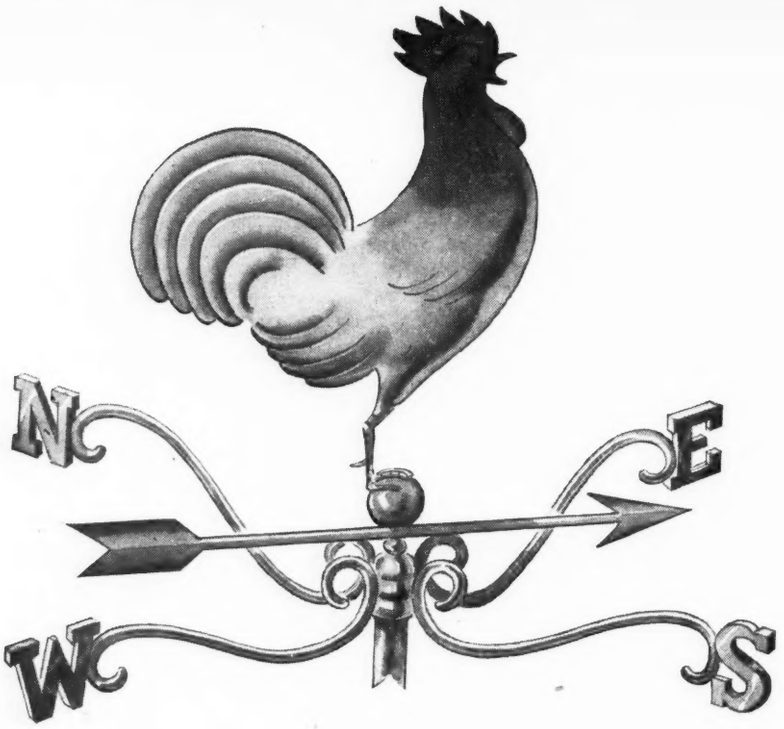
I read with interest the letter addressed to you by W. C. Sharbrough of Holly Bluff, Miss. I feel that to clear up this matter for him and for others who may have made similar observations a reply is in order.

As a soybean breeder, I found the Ogden variety very interesting and also very helpful. A bird's-eye view of a field of Ogdens might lead one to think they were very uniform. I have made many hundreds of plant selections from Ogdens at various times, and then by further selection I have been able to isolate several very distinct types. This would indicate that a high degree of uniformity was lacking.

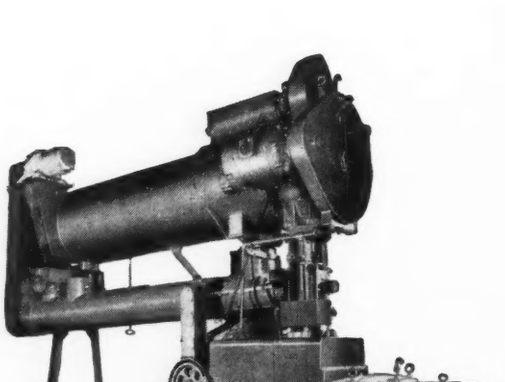
The two most spectacular and easy to see characteristics in which I have obtained a wide degree of variation and which is *not* due to *environment*, are differences in time to maturity and differences in resistance to shattering. These are *inherent* differences since they breed true from year to year. I would refer the reader to a report of my variety test which appears elsewhere in this copy of the *Digest*. Dortchsoy No. 2 and No. 31 were both selected from the Ogden variety. The Dortchsoy No. 2 has the same maturity as Ogden, but has greater yielding ability and an increase in shatter resistance. The Dortchsoy No. 31 resembles the Ogden in its general plant characteristics, but is a full *3 weeks* later in maturity than Ogden and has a high degree of shatter resistance which is completely lacking in the Ogden variety.

As for the appearance of true mutations, they are indeed rare, not only in beans but in most species of plants and animals. However, variations which arise as recombinations of factors or through segregation following hybridization may be observed occasionally. Even this kind of variation is relatively uncommon in soybeans because they are very highly inbred and natural crosses are very rare. The chance of finding variations due to gene recombination is better in varieties that have originated through hybridization. The breeder is constantly on the alert for promising variations, for it is by this means that progress is made in a breeding program.

Replying to Mr. Sharbrough's last question: there is little likelihood that much improvement would be made unless he is prepared to make hundreds of selections and enter upon a 5- to 10-year program of breeding testing and increasing new strains. Such a program would undoubtedly yield results in the due course of time and after much work as has ours, but unless it is undertaken in this way it is unlikely that much progress would be made. —*L. M. Humphrey, plant breeder, Robert L. Dortch Seed Farms, Scott, Arkansas.*



Whichever way the wind blows—



Anderson Twin-Motor Super Duo Oil Expeller

You can easily change from one oil-bearing material to another if you depend on Expellers* (Anderson's continuous screw press) for your oil extraction. If soybeans are not available you can press cottonseed or flaxseed—or peanuts, copra, rape seed—in fact almost any oil-bearing material that offers you a good spread. This way you are in a position to take advantage of market changes, crop conditions and the multitude of swings that affect profits. Let the chance takers risk the long gamble—you play safe when you choose Expellers. Get all the facts before you decide, write today!

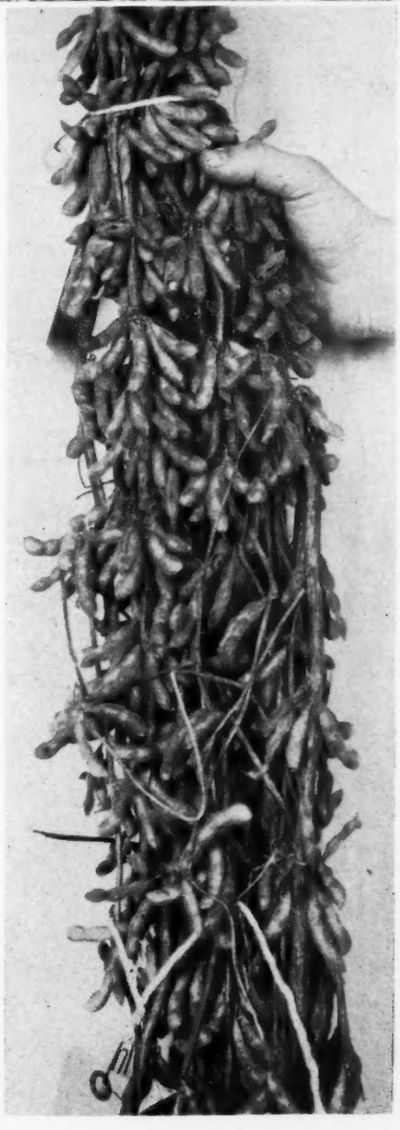
THE V. D. ANDERSON COMPANY
1976 West 96th Street • Cleveland 2, Ohio

* Exclusive Trade Mark registered in U. S. Pat. Off. and in foreign countries.

ANDERSON EXPELLERS & SOLVENT EXTRACTION EQUIPMENT

New Soybean Makes Its Bow---

After Death of Originator



Above, Bascom M. King at work in the summer of 1946. Right, a typical plant of Missouri S-100.

• *While in a state of nervous collapse due to failing strength and overwork, Bascomb M. King took his own life last May 1. He left behind him real achievement in pioneer work with soybeans in Missouri, and the new variety, Missouri S-100.* —EDITOR.

AS PLANT breeders and certified seed growers in six states this spring plant their first allotments of foundation seed stock of Missouri's new soybean variety, S-100, their thoughts will turn to the late Bascomb M. King, who worked for a dozen years on its development at the Missouri Experiment Station.

Accepted because of its high yield and its favorable habits of growth, this medium late, yellow-seeded variety will be planted for increase this spring in southeast Missouri, Arkansas, Mississippi, Tennessee, and Virginia. A minor portion of the recleaned pure seed (about 140 bushels) will be distributed to the experiment stations in the states just named outside that of its origin. More than 1,000 bushels will be planted for increase and certification by selected farmers in Missouri's cotton counties.

Besides its high yields and satisfactory oil content, the new bean offers strategic advantage by distributing the bean harvest over a longer period of time. Though medium late in ripening, it matures about 2 weeks ahead of the late varieties that heretofore have been used in the cotton-soybean rotation.

In several years of test-plot comparison in Missouri, S-100 has consistently outyielded Chief, Patoka, Gibson, Macoupin and Boone. It is what soybean growers know as a good performer—a good all-round producer. The success of this variety, as it goes out for increase this year, is the type of thing that the patient researcher in improvement of crop plants must always dream about and believe in as he toils year after year in his endless rounds of recrossing, selecting, discarding, recording, comparing—and starting over again.

It was this challenge that appealed to Bascomb King as a student at the University of Missouri in the fall of 1916, when he was first given part-time employment in the field crops department. From the first he showed outstanding aptitude and diligence, relates Prof. C. A. Helm, who was associated with him in this work from its beginning.

King's student work was interrupted by 3 years of service in the Navy at the time of World War I, but he came back to his work, received his bachelor's degree in 1921 and his master's a year later. Then in 1924 he became a full-time member of the research staff in field crops at Missouri. He did a great deal of work in oats and other small grains, making the original crosses from which some of our present most promising strains of oats originated.

Very early in his work at Missouri, Bascomb King was made responsible for the testing, breeding and selection program for

the soybean crop. One of his outstanding accomplishments in this field was the development of a series of strains produced from a natural hybrid found by a farmer in northeast Missouri some 15 years ago. It was a single plant heavily loaded with seed, standing out as obviously superior in a field grown from bin-run seed. The plant was sent to the experiment station by its discoverer and this chance find was turned over to King for testing.

After a dozen years of work, throwing out the undesirable plants and saving only those that perpetuated or surpassed the best traits of the original hybrid, King had 50 bushels of clean foundation seed of strain S-100 by the spring of 1947. But even as he prepared the seed and other equipment for his annual planting tasks for the Experiment Station, King died suddenly last May 1, just after finishing a lecture to his class in fiber crops.

Associates Planted

Associates under Professor Helm's direction made the plantings King had planned. The harvest yielded somewhat more than 1200 bushels of recleaned seed of S-100, which was already in demand by plant breeders in neighboring states. This coming fall, in the six states now planting the new bean for increase, there should be enough pure seed to plant around 25,000 acres.

The labors of thousands of men in the years to come will be more richly rewarded because of the discernment of one farmer years ago in discovering a single superior plant, and because of the scientific research of King and his associates through the succeeding decade and a half.

Bascomb Monroe King was 55 years old at the time of his death. He was born and reared on a ranch near Stockdale, Texas. He was of early pioneer stock, a lover of the outdoors, patient, modest and altogether dependable.

An associate of many years said of him: "Bascomb King was one of the best loved men among the University faculty. His kindness was unbounded, and he was gentle. He was quiet, self-effacing and wise. His tolerance reached to the limits of his understanding, even as his native Texas prairies broaden into their horizon.

"Bascomb King's devotion to duty was a beautiful trait to have seen and to remember. It arose from an innate nobility of purpose; it was guided by a stainless honor. He wanted simply and humbly to be fruitful for the good of his fellow men.

"Bascomb King loved and understood that which is naturally beautiful. He loved to greet the rising sun in wide quiet places where the earth was fresh and clean. Often his friends have heard him say, 'One who misses this will lose the best part of life.' We know that now he walks the bright morning fields, his eyes uplifted."

—s b d—

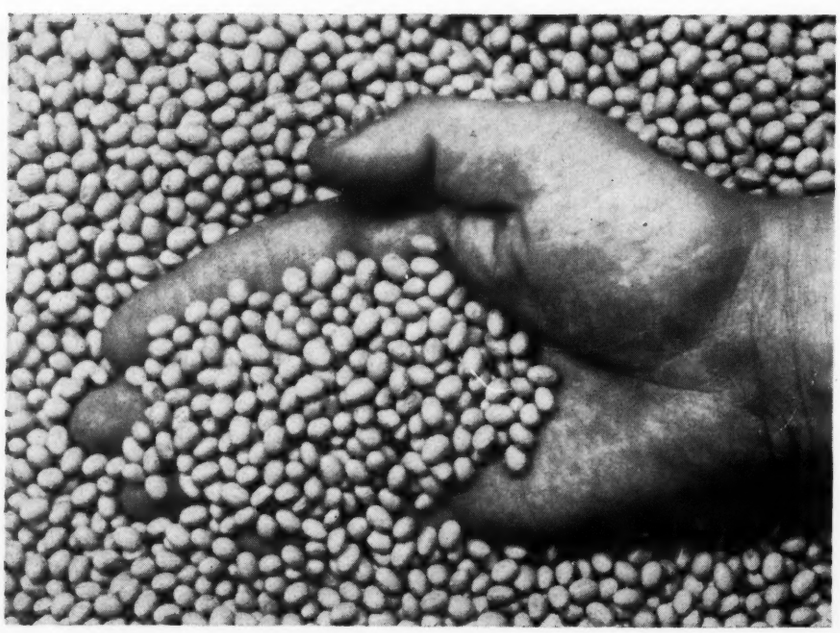
SOYBEANS ON AIR STRIP

Perhaps grass doesn't grow underfoot at the municipal airport in Columbus, Ind., but soybeans do—and to the tune of a $4,225 profit for the city aviation commission which recently reported sale of the produce, reports *Construction Digest*.

The city obtained an 800-acre tract of land on which to build a comparatively small airfield last year and it was decided then to put 150 acres in soybeans with the profits to be shared 50-50 with a sharecropper.

Local aviation officials were quick to point out after announcing their profit that the funds would be well spent on a $10,000 to $12,000 blacktop resurfacing program for runways. Airplanes also use the field.

Recleaned seed of Missouri S-100.



SOYBEAN: *Most*

By J. W. HAYWARD
Member, Soybean Research Council

HISTORIANS of agriculture probably will place the soybean in a high position when the full story is told of the wartime feeding program.

Soybean oil meal carried the protein load during the war years, and it continues carrying the load in the postwar period of serious shortages.

Total production of soybean oil meal during the crop year—October 1947 up to October 1948—is expected to reach 3,375,000 tons.

This would compare with total production of soybean oil meal of 4,084,097 tons in the preceding year.

Farmers and feeders learned during the war period the high value from a profit viewpoint of a planned protein ration. There never has been a time when production of protein has been sufficient to balance more than one-half of all farm grains fed in the United States.

Since soybean oil meal constitutes the largest available protein supply for feeding purposes, government officials, the feed trade, and university authorities all have given recognition to the need of a continued large soybean production. It is agreed, generally, that European crops could not become again abundant in a short period of time. Under the proposed American food exporting program it would appear that soybean protein will continue in substantial demand.

Figures for the production of the various protein concentrates during the past several years are given in Table 1. This relative status will still apply this year, regardless of slight changes.

Fed for Protein

Before discussing soybean oil meal, I would like to make a few comments applicable to this class of vegetable protein feeds as a whole. Usage of oilseed meals in feeds for livestock and poultry is recommended primarily as a source of protein. Protein is their principal attribute. They differ in this respect from animal and marine by-products which supply in addition to protein a good amount and a rather good assortment of minerals and a variable assortment of the vitamins of the B-complex. In most animal protein concentrates, there is also a nutrient, referred to by some investigators as an animal protein factor and by others as a vitamin-like factor, which acts in an additive way in improving soybean oil meal and other vegetable proteins. This nutrient factor is found

Versatile Protein Meal

abundantly in sardine and Menhaden fish meals, condensed fish solubles from the processing of these fish, all milk products, animal liver meal, and liver extracts. Current production of meat and bone scraps and tankage varies considerably in content of this factor needed by vegetable proteins. Some supplies of these packing house by-products are good sources while others do not appear to contain appreciable amounts of the so-called "Animal Protein Factor."

Optimum nutritional balance between protein and carbohydrate feeds never has been achieved in practice in this country as a whole.

Large available quantity of soybean oil meal gives it an exceptional significance. The product also ranks high in its quality of protein. Numerous tests have shown it to excel all other vegetable proteins as a complete source of essential amino acids, a statement illustrated in Table 2. When properly supplemented with vitamins, minerals and in some instances, unidentified factors contained in certain non-vegetable materials, soybean oil meal constitutes a complete and adequate protein supplement for all classes of livestock and poultry. Soybean oil meal competes with all animal and marine protein. This is in contrast to the other oilseed meals which do not contain protein of such high quality. Soybean oil meal finds a ready outlet in poultry and swine rations, and it continues to be a popular ingredient in dairy feeds. It is estimated that soybean oil meal represents about 40 percent of all the oilseed meals consumed by dairy cattle.

It is stated that during the years 1940 to 1946 the average production of eggs on a national basis rose steadily from 134 to 154 per hen. Good poultry feeds have been given part of the credit for this increase. It is often conceded that two feed items contributed greatly to this success. Soybean oil meal was one and riboflavin in one form or another was the second.

General acceptance and satisfaction of soybean oil meal in poultry rations and in critical rations for swine was not an accident. It was the result of considerable painstaking work by many nutritional investigators. Soybean oil meal has been a principal subject of nutritional investigations during the past few years. It is still under scrutiny, for that matter, which is a healthy sign.

Investigators at Purdue University have presented good evidence to the effect that corn gluten meal protein supplements the protein of soybean oil meal very materially. They are not content to believe, however,

(Continued on page 15)

—U. S. Department of Agriculture photo

The average hen lays 20 more eggs in a year than she did in 1940. One reason is the use of better feeds, including soybean oil meal

TABLE 1: PRODUCTION OF PROTEIN CONCENTRATES IN THE UNITED STATES

Crop Years October 1 to September 30

Protein Concentrate	Average 1930-40 1,000 tons	1940-41 1,000 tons	1941-42 1,000 tons	1942-43 1,000 tons	1943-44 1,000 tons	1944-45 1,000 tons	1945-46 1,000 tons	Estimate 1946-47 1,000 tons
Soybean Oil Meal	482	1,543*	1,845*	3,200*	3,446*	3,682	3,837†	4,085
Linseed Oil Meal	248	652*	911*	790*	975*	585	562	375
Corn Gluten Feed and Meal	548	624*	819*	1,013*	914*	863*	776	997
Cottonseed Meal	1,951	1,954*	1,753*	1,995*	1,834*	1,954*	1,406	1,427
Peanut	38	133*	57	100*	108*	93*	80	113
Copra‡	120	175	71	34	33	42*	67	195
Tankage and Meat Scraps‡	642§	802	835	877	975	792	745	750
Fish Meal‡	234	263	207	202	196	215	177	182
Dried Milk‡	135§	145	125	95	100	90	80	85
Other Dried Milk Products¶	1,616	1,735	1,685	1,660	1,545	1,515	1,450	1,460
TOTAL	6,014	8,026	8,308	9,966	10,126	9,831	9,180	9,668

*Agricultural Statistics, 1946. †December 1946 FEEDSTUFFS. ‡Estimated Disappearance of Feeds, Agricultural Statistics, 1946. §Average 1934-40. ¶Dry equivalent of skimmilk, buttermilk, whey and whole milk estimated fed on farms.

TABLE 2: AMINO ACID ANALYSIS OF OIL SEED MEALS

(Dried Skimmilk and Corn for Comparison)

	Dried Skimmilk 34% %	Linseed Oil Meal 33% %	Soybean Oil Meal 45% %	Cottonseed Oil Meal 42% %	Corn Gluten Meal 42% %	Peanut Oil Meal 45% %	Whole Corn 8% %
Arginine	1.46	2.77	3.19	3.11	1.30	4.46	0.38
Histidine	0.88	0.49	1.03	1.09	0.67	0.95	0.18
Lysine	2.55	0.82	2.61	1.13	0.34	1.35	0.16
Tyrosine	1.80	1.68	1.85	1.34	2.81	1.98	0.44
Tryptophane	0.54	0.49	0.54	0.55	0.29	0.45	0.06
Phenylalanine	1.94	1.85	2.57	2.86	2.69	2.43	0.40
Cystine	0.34	0.63	0.85	0.84	0.46	0.72	0.12
Methionine	1.16	0.76	0.90	0.88	1.05	0.54	0.25
Threonine	1.53	1.68	1.80	1.26	1.72	0.68	0.30
Leucine	3.84	2.31	2.97	2.10	10.08	3.15	1.76
Isoleucine	2.89	1.32	2.11	1.43	2.10	1.35	0.32
Valine	2.86	2.31	1.89	1.55	2.10	3.60	0.40
Glysine	0.78	—	high	2.23	1.81	2.52	—

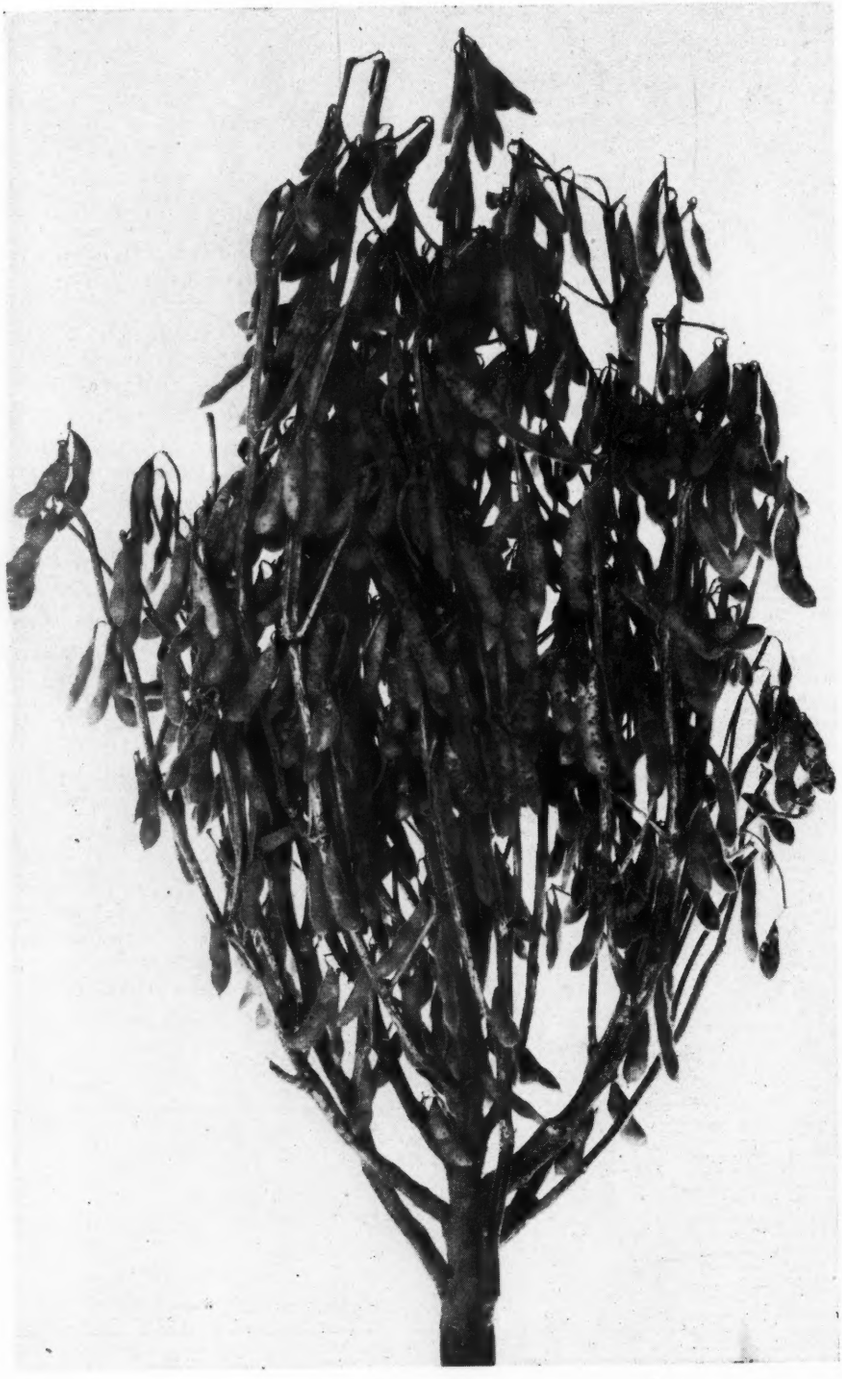
Ref: Block, R. J. and Mitchell, H. H. 1946-47 The correlation of the amino acid composition of protein with their nutritive value. NUTR. ABS. & REV. 16:249-278.

R. L. Dortch Seed Farms

1947 VARIETY TEST

By L. M. HUMPHREY
Plant Breeder, Rob't L. Dortch Seed Farms, Scott, Ark.

Plant of new Dortchsoy No. 31, destined to take a prominent place among soybean varieties.



Along with our extensive breeding and other experimental work with soybeans, we conduct a careful study of our own and other widely used or otherwise promising soybean varieties. The purpose of this article is to report the results obtained from our test of commercial varieties conducted in 1947.

The test was conducted on the Station Place Plantation of the Robert L. Dortch Seed Farms at Scott, Ark. The 27 varieties reported in the accompanying table were included as well as 13 experimental strains which are not reported. The soil on the part of the plantation devoted to the breeding programs as well as other experimental work with soybeans, cotton and corn is fine sandy loam Arkansas River bottom soil of a little better than average fertility. The pH is 6.7; and 300 pounds of 3-9-18 fertilizer were broadcast on the land before the final disking before planting. In order to obtain uniform plant competition and to make possible a study of individual plant behavior and performance, the test was planted in hills 22 inches apart and thinned to one plant per hill. Rows were 38 inches apart and 60 feet long. Five randomized replications were used, and rows in the last replication were extended an extra 120 feet. This part of the last replication was not harvested, but was left for observations on shattering and effects of weathering long after harvest. At harvest the plants were cut by hand and threshed on a small portable power driven thresher. The test was planted May 14, 1947.

Yields are a little higher than field yields as they always are in tests conducted in this way. Past experience has indicated that a reduction of about 20 percent in the yields given in the table would give yields comparable to those that might be expected by combining and on soil of comparable fertility.

Discussion of Varieties

Yield—The highest yields were made by midseason and late varieties with large beans. This must not be assumed to mean that all late varieties yield well. They must also be adapted. The fact that no early maturing variety performed well presents a challenge to us as soybean breeders to produce an adapted early maturing variety that will yield as well as the later maturing adapted varieties.

Dortchsoy No. 31 and Dortchsoy No. 2, both selections from the Ogden variety, made the highest yields. In the 2-year averages these varieties made very nearly the same yields. Reference to the table will reveal that Dortchsoy No. 31 is 3 weeks later in maturity than Dortchsoy No. 2. This makes it a fine companion variety for the Dortchsoy No. 2. It greatly extends the combining period and thus increases the usefulness of the combine. The accompanying photograph shows a plant of Dortchsoy No. 31 taken from the part of the test left for shattering observations 24 days after maturity. These

beans were still in excellent condition for combining.

Shattering—A very hot dry summer contributed to making beans shatter unusually severely. This was especially true on land where the soil was badly depleted. Such highly resistant varieties as the Dortchsoy No. 7 were observed to shatter considerably on land which for one reason or another was badly lacking in fertility, but on more fertile fields shattering was negligible. The land on which the test was grown is relatively fertile. Even so a reasonably sharp distinction is evident between the varieties that have shatter resistance and those that do not. Varieties showing less than 10 percent of shattering 30 days after maturity may be considered highly resistant.

1947 Drought

Drought Resistance—1947 was an excellent year to study varietal resistance to drought and prolonged heat. The U. S. Weather Bureau at Little Rock, located at the Little Rock airport approximately 4 airline miles from Scott, recorded the following facts: during the 77-day period from June 24 to September 11, total rainfall was 2.43 inches; from July 28 to August 10, the mean maximum temperature for the 14 days was 101°; again from August 30 to September 7, the mean maximum temperature for the 10-day period was 101° with 106° recorded for September 1.

The combination of protracted drought and extreme heat at critical times damaged the bean crop materially. Damage from heat and drought was evidenced either by the shedding of the blooms or by the death of the plants in cases of serious susceptibility. Both Dortchsoy No. 31 and No. 2 showed a high degree of drought resistance as shown by the fact that there was no material decrease in yield from 1946. All of the top ranking 10 varieties showed from good to excellent drought resistance.

Bean Size—It is interesting to note and very probably significant that all of the leading varieties had large size beans. This has proved to be the case in previous years' tests as well, and is being given due consideration from the breeding standpoint.

Lodging—Lodging was bad in varieties having a viney type of growth or in varieties producing long limbs that had a tendency to drop down at maturity. Any parts of the plants falling below about 6 inches from the ground would be lost at combining since the sickle would pass over them. A stiff upright stalk with short upright branches is the desirable type because such plants rarely lodge and more beans are saved at harvest.

Days to Maturity—May 14 is about the middle of the soybean planting season in this region. As is well known, soybeans have a tendency to mature about the same time regardless of when they are planted. Soybeans respond physiologically to the length of the period of daylight in such a way that when the season progresses to a point where the period of daylight is of the proper length the beans mature their crop. For this reason beans planted early will show a longer period of time to maturity than those planted later. However, the relative maturity periods of different varieties will remain fairly constant. The only really satisfactory way to stagger the maturity of parts of a soybean crop is to plant varieties having different time requirements for reaching maturity.

In this region those varieties in this test that matured in 130 days or less are early, those maturing in 150-160 days are of medium maturity, those maturing in 165-175 days are medium late, and those maturing in 180 days and later are very late. Beans of this last group are likely to be in danger of serious damage from early frost.

In addition to our soybean breeding and testing program, we are conducting rather extensive tests on response to lime and fertilizers, and to spacing and various cultural methods, results of which will be published at a later date. Information on proper soils and advanced cultural methods are essential to bring about higher and more profitable yields of soybeans.

—s b d—

1947 SOYBEAN VARIETY TEST — ROBERT L. DORTCH SEED FARMS, SCOTT, ARK.
Planted May 14, 1947

Rank	Variety	Yield Per Acre 1947	Yield Per Acre 2-Yr. Ave. 1946-1947	Days to Maturity	Bean Color	Bean Size	Lodging	Shattering At Maturity	Shattering After 15 Days	Shattering After 30 Days
1	Dortchsoy No. 31	48.3	50.1	173	Green	Large	None	None	Trace	3%
2	Dortchsoy No. 2	46.4	49.2	152	Green	Large	None	Trace	5%	20%
3	Burdette No. 2	42.2		152	Green	Large	None	1%	10%	30%
4	Roanoke	38.2	40.3	175	Yellow	Large	Medium	None	Trace	5%
5	Volstate	37.7	43.9	175	Yellow	Large	Medium	Trace	2%	20%
6	Burdette No. 12	35.4		158	Green	Large	None	3%	20%	40%
7	Nela	35.3		180	Yellow	Medium	Medium	None	Trace	5%
8	Ogden	35.2	39.2	155	Green	Large	None	3%	20%	40%
9	Dortchsoy No. 7	34.4	37.8	150	Yellow	Small	None	None	Trace	5%
10	N44-744	33.0		170	Yellow	Small	None	None	3%	10%
11	Wood's Yellow	32.7		185	Yellow	Very Lge.	Medium	2%	25%	40%
12	N42-26	29.2		162	Yellow	Small	Medium	None	Trace	20%
13	Arksoy	28.4	33.1	150	Yellow	Small	None	None	5%	25%
14	S100	28.4	28.8	130	Yellow	Small	None	None	3%	40%
15	20-43 Toark	25.2		153	Yel-Br.	Medium	Medium	Trace	8%	50%
16	Tensa	25.1		175	Yellow	Small	Very Bad	Trace	Trace	5%
17	Hongkong	25.0		130	Yellow	Small	Very Bad	None	3%	40%
18	S46-81	24.6		164	Yellow	Small	Very Bad	4%	15%	20%
19	U. S. No. 2	24.4		122	Yellow	Small	None	None	5%	15%
20	C. N. S.	24.2		168	Yellow	Small	Very Bad	None	1%	5%
21	Burdette No. 19	23.6	28.8	150	Yellow	Small	None	Trace	10%	30%
22	Macoupin	22.1	23.5	130	Yellow	Small	None	Trace	20%	60%
23	17-43-A	22.0		158	Yellow	Medium	Medium	None	2%	8%
24	S45-92-2	21.8		165	Yellow	Small	Very Bad	2%	10%	15%
25	12-43-Toark	21.4		153	Yel-Gr.	Medium	None	Trace	4%	25%
26	Boone	21.0		130	Yellow	Small	None	None	Trace	25%
27	S45-91-13	20.7		165	Yellow	Small	Very Bad	5%	15%	20%
	Difference required for significance	4.3								

HAYWARD

(Continued from page 13)

that this supplementation is entirely on the basis of the higher methionine content of the protein in corn gluten meal. In feeding experiments with swine, the University of Minnesota (unpublished date) found that a ration of one part sardine meal to nine parts soybean oil meal produced much better results as a protein supplement to corn than tankage or soybean oil meal alone or a ratio of one tankage to four soybean oil meal or one tankage to nine soybean oil meal.

In recent years a great deal of attention has been accorded the subject of cooking soybean oil meal. Many investigators have demonstrated a trypsin inhibitor in raw soybeans which can be removed by extraction with suitable solvents or is inactivated by the proper kind and amount of heat. This trypsin inhibitor is claimed to be the reason why the protein of raw soy products is not well utilized for growth by critical animals and poultry. It seems to be a plausible explanation for the greater availability of methionine and possibly other amino acids when soybean oil meal is properly cooked during processing.

A quiet revolution in feeding methods has been under way. It involves recognition that a well balanced ration from the standpoint of ample protein results in greater profits.

—s b d—

IOWA MILL FIRE

A fire in the solvent extraction plant of Cargill, Inc., at Washington, Iowa, in December was confined to that unit with damage probably under $200,000, according to reports reaching the *Soybean Digest.*

The fire did not spread to the Cargill feed mixing mill or the concrete storage bins which have a capacity of 200,000 bushels.

Reports were that the fire started when a spark from an electric switch ignited solvent fumes, but this was not confirmed by the management, according to *Washington Journal.* The plant had been shut down for the installation of new machinery. When the power was turned on there was a burst of flame in the solvent material, according to the *Journal.* Nobody was injured.

Naptha solvent is employed at the plant, which has a daily capacity of 60 tons of soybean oil meal.

FIGHTING *the High Cost of Living* WITH SOYBEANS

By ARCHIE SHAMEL

Associate in the Experiment Station, University of Calif. Citrus Exp. Station, Riverside, Calif., from talk before the Riverside Rotary Club.

Introduction

AGRICULTURAL prophets, including the Secretary of Agriculture, Clinton P. Anderson, have predicted recently that we will have a shortage of several important foods during coming months.

Our emergency food exports are currently reported as largely responsible for the present high prices for many of our agricultural products. The majority of our people seem to be convinced that we must continue to export wheat and other foods to the hungry peoples of Western Europe and other countries which were ravaged by World War II. Of course, increased food production here or abroad to relieve this condition is not possible this winter and, owing to circumstances over which we have no control such as the weather, there is no certainty that the food situation can be improved within the next crop season. It may even become more acute.

Is there any possible method of relief from the present food shortage and the related high cost of living? Yes! I will attempt to outline briefly such a method which I consider to be practicable. It is the substitution of soybeans for some of the costly foods to which we are accustomed. This will not only tend to relieve our food shortages and consequently aid in reducing the present high cost of living; it may actually benefit those who will accept this new diet. I myself have found this to be true and in addition I have the opinions of distinguished scientific and nutrition authorities confirming this conclusion.

I have no illusions as to the difficulties of effecting any major change in our food habits; but I am willing to make a small effort towards that end as a public service. I do not hope for any reward but I do expect disagreement with my point of view from certain individuals and organizations. These include those who benefit from our present food prejudices and others who fear their incomes may be affected.

Soybeans have been one of the main sources of food in China for more than 5,000 years according to recorded history. Today soybeans are the principal source of protein for millions of orientals. Soybeans, rice and fish make up the basic diet of more people than the combined populations of America, Europe and Africa. This food has sustained the Chinese for thousands of years. They are said to be singularly free from several of our most deadly diseases, such as heart ailments and diabetes.

Most orientals cannot afford to use meat, butter and milk and other animal products. They have been forced by necessity to use soybeans instead. In doing so they may have taught us an important lesson in human nutrition if we wish to learn it.

History

Christian missionaries and other English explorers introduced the soybean into England on a very small scale about 1790. About 1820 our own missionaries and visitors to China from the United States brought to America small amounts of soybean seed which were grown experimentally at several locations but none in the Cornbelt. The location of those first trials is important in the history of the soybean industry in this country. None of the early introductions into the United States nor those in England proved to be of any commercial significance.

While a student in the College of Agriculture of the University of Illinois from 1894 to 1898 inclusive, I became interested in soybeans and cowpeas, especially from the standpoint of improving the soil and as cheap additional protein foods for livestock. I had previously proved to my own satisfaction the importance of other legumes, especially clovers, in rotation with corn on our own farms in Christian County, now a leading soybean-producing county in Illinois. I was astounded by the extraordinarily abundant development of very large nodules on the roots of my soybean plants. These nodules are the result of the work of bacteria which gather nitrogen from the air and thus improve the soil where the nodules grow, as is the case with peas, beans, clovers, alfalfa, and other legumes.

During part of my senior year at the University and for 4 years afterward I was superintendent of the Experiment Station farm. In addition I had charge of the department of farm crops. I mention this to make it clear how I happened to become a pioneer in soybean introduction and growing in the Cornbelt. It was then that I first obtained small quantities of soybean seed from several sources, including the U. S. Department of Agriculture and our diplomats in China and Japan, for trial at the Illinois Agricultural Experiment Station.

In 1902 I entered the United States Department of Agriculture at Washington, D. C. The move was on the advice and at the invitation of that grand pioneer and founder of scientific American agriculture, Secretary James Wilson, or "Tama Jim" as he was affectionately known throughout the Cornbelt. I explained to Secretary Wilson the reasons for my interest in and enthusiasm for soybeans, especially my belief in their superior value for soil improvement and as a protein supplement to corn for feeding livestock. The secretary had my requests for additional soybean seed transmitted through the Department of State to our American consuls in China and Japan.

As a result I received several bushels of soybean seed of several varieties with their Chinese and Japanese names from those countries, mainly from China. Part of this seed I sent direct to the Illinois Experiment Station at Urbana, and the remainder I turned over for other distribution by my friend, A. J. Pieters, who at that time was in charge of the Office of Congressional Seed Distribution of the U. S. Department of Agriculture.

I believe that it was through those introductions, particularly the ones in Illinois, that our commercial soybean industry has been developed during the past 50 years. Soybeans have succeeded best in the Cornbelt, and Illinois is now the largest producer of soybeans, about double the crop of Iowa, its nearest competitor. Those two states, together with Missouri, Indiana, and Ohio, now produce most of our soybeans.

Production and Values

The first experimental plantings of soybeans in the United States were grown for soil improvement and for forage and pasture purposes. Only recently has any considerable part of the crop been used for human food. In the beginning, I had only seven or eight varieties to work with at Illinois but now more than 2,700 varieties have been reported.

An ever-increasing number of vegetable varieties are now grown for human food in this country as compared with field varieties which are grown for livestock feeding and for soil improvement. Systematic breeding by state and federal experiment station workers is resulting in the development of specialized varieties which are adapted to different climatic conditions and for particular uses. I am told a man at Lee, Mass., suc-

cessfully grows a variety that matures its seed in 90 days as contrasted with many varieties which require about 120 days. Researchers are constantly discovering new soybean products of great potential value. It seems certain that the production and the uses of soybeans in this country are still in their infant stage.

Soybean Uses

The uses of soybeans may be classified under three principal heads: (1) plants for hay, ensilage, pasture and green manure; (2) green beans which are used for "bean sprouts" in Chinese dishes such as chop suey, and often canned, frozen or otherwise preserved for human food; and (3) dried beans. From the dried beans more than 57 human foods are now commonly manufactured, as well as 50 or more kinds of plastics and other industrial products.

ARCHIE SHAMEL

Dried soybean products may be further classified for our purpose into two general groups, viz., (a) meal, and (b) oil. From the meal, bean flour is produced for making bread, confections, cakes, pastries, infant foods, soy milk, and breakfast foods, all of which are often recommended for diabetic sufferers on account of their low starch content. They are also frequently advised for those suffering from heart ailments on account of their relatively high lecithin content and other values. Soy sauce is familiar to all customers of Chinese and Japanese restaurants and is reported as the most important ingredient in many of our table sauces.

From soybean oil another large group of products is now manufactured, including cooking fats and edible oils, soaps, shampoos, inks, linoleum, and others too numerous to mention here. Also from the soybean oil, lecithin is now isolated, which has recently been proved to be a valuable food for brain and nerve tissues.

Vitamins A, B, and C are important constituents of soybeans. Probably additional health values will be discovered on further research. Soybeans also furnish essential minerals for human nutrition. They probably develop the most nearly complete human food of any plant. While orientals supplement them with rice and fish, and in some cases other cheaply grown food products when they can afford them, they have been known to subsist on soybeans alone for long periods of time. Soybeans are one of the great foods of the civilized world.

We can save wheat by using soybean bread instead of wheat bread and thus cooperate in the admirable effort to conserve our wheat supply. After making this diet change in our food habit, the Shamel family now prefer soybean bread to wheat bread, particularly when toasted. And it is less fattening! Also, we are gradually becoming accustomed to eating other soybean foods, such as candy, cookies, cakes, energets, sprouts, and baked soybeans. And they are less fattening! We have not reached the stage where we can substitute soybean protein steaks for porterhouse steaks, but we have made a beginning with a soybean diet and have learned to like it. Perhaps you too will learn to like it if you have the courage to try it. Soybeans are gradually being more and more widely used by many people in this vicinity under normal economic conditions for health reasons and as substitutes for meat and other high-priced foods. And they are less fattening! If the cost of living continues to mount as now seems probable unless our inflationary spiral is controlled, the use of soybeans is likely to become increasingly important.

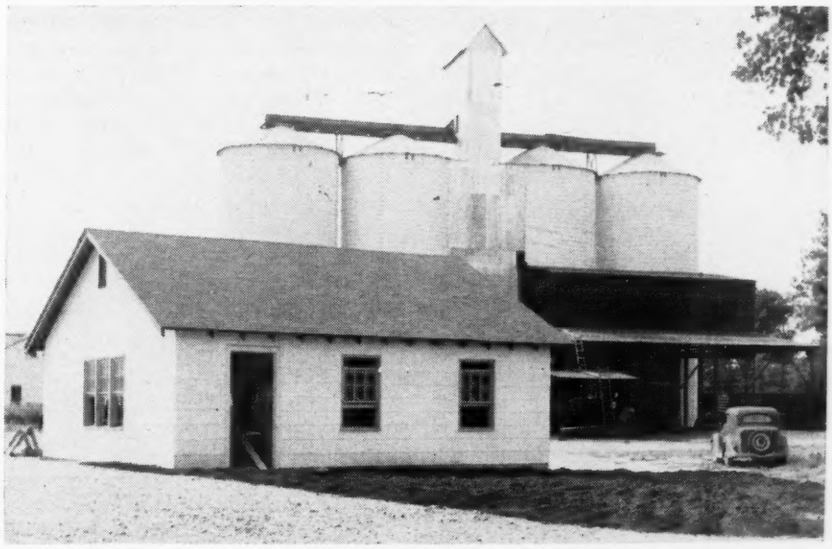
Why are soybeans called our miracle crop? A glance at the chart showing the production and value of soybeans grown in the United States for the past 25 years, supplies the answer. Within that period and largely during the past 8 years soybeans have become one of our major farm crops, worth approximately a billion dollars annually to the growers as a cash crop, as a livestock feed and for soil improvement. Truly this astounding development and the many newly discovered uses of soybeans may be termed miraculous.

How can soybeans reduce our high cost of living It can be done through substituting this relatively low-priced, nutritious and valuable food for wheat products, and to a lesser extent perhaps in the place of some of our meats, poultry, eggs and other foods, which are so expensive at the present time.

Some authorities believe that many of our own people, as well as many in foreign countries, do not have and never have had enough to eat. It is estimated that there are about 4 billion acres of cultivatable land on the globe. The latest estimate of the world population is that a total of more than 2 billion people exist today, or one for every 2 acres of soil on which food crops can be grown. This huge population is increasing rapidly, due to sanitary practices, scientific medicine, and other factors contributing to longer life expectancies. Can 2 acres be made to produce adequate food for each of those persons under the present agricultural practices? Many competent observers seriously doubt this unless we change our food habits somewhat or unless scientific research develops new methods of food production partly or wholly independent of the soil.

Missouri Soybean Co. Elevator

This is the Missouri Soybean Co.'s new $80,000 soybean elevator at Hayti, Mo., which was opened last fall. The plant has facilities for unloading six trucks at a time. A special edition of the Missouri Herald featured the opening of the elevator.



General view of the soybean breeding nursery on the Central Experimental Farm at Ottawa.

Soybean Breeding at OTTAWA

By F. DIMMOCK

Breeding work with soybeans was begun at the Central Experimental Farm, Ottawa, Ont., in 1928. The main objectives of the program were to develop early maturing high yielding varieties of desirable plant type, suitable for production in eastern Ontario and southern Quebec and other short seasoned areas throughout Canada.

At the time when the breeding program was begun there were few, if any, varieties available, suitable for recommending in this area. A collection was made of the best material that could be located with which to initiate the breeding work. The earliest variety secured was Manitoba Brown, a selection made at the Manitoba Agricultural College, from Ogemaw. Others included Wisconsin Black, Mandarin, Ito San, Manchu, together with collections from the United States Department of Agriculture, the Royal Botanic Gardens, London, England, and several private sources.

A selected line of good type from Mandarin x Manitoba Brown, at the Central Experimental Farm, Ottawa.

First Varieties

The whole collection of varieties and strains was planted in an introduction nursery in 1928 and careful observations made and recorded throughout the season. None of the individual varieties seemed to incorporate sufficient of the desirable agronomic characters to make them suitable for immediate use. Manitoba Brown was sufficiently early in maturity but the plants were short, the pods shattered badly on ripening, the yield was low and the seed coats were brown. Wisconsin Black was tall enough but the stems were weak and lodged badly and the seed was black. Ito San and Manchu were both a little late in maturity. Mandarin also tended to be a little late, but individual plants within the variety varied sufficiently in this respect that many selections were made. Most of the other strains planted were either too late or were sufficiently undesirable in certain other respects that they were either discarded or only a limited number of selected individual plants were retained.

By 1934 sufficient progress had been made to request a license for the sale of a selection from Mandarin, which was named Mandarin (Ottawa). It was accepted for registration by the Canadian Seed Growers Association in the same year. Mandarin (Ottawa) remains the most popular variety in eastern and central Ontario and is still the standard used by many growers to judge the merits and value of more recent varieties.

As the years passed additional new varieties have been developed and made available to growers. In 1937 the variety Kabott was released. It was 10 days earlier in maturity than Mandarin (Ottawa) and originated from a mixed lot of seed obtained in 1933 through R. R. Kabalkin, London, England and collected in the district of Ninguta, Manchuria. In 1939, seed of Pagoda was made available to growers. This variety ripens about 10 days earlier than Kabott and represents one of the progenies from a cross made in 1930 between Manitoba Brown and a selection from Mandarin. Pagoda combines the early maturity of Manitoba Brown with the greater growth, increased yield, absence of shattering and yellow seed of Mandarin.

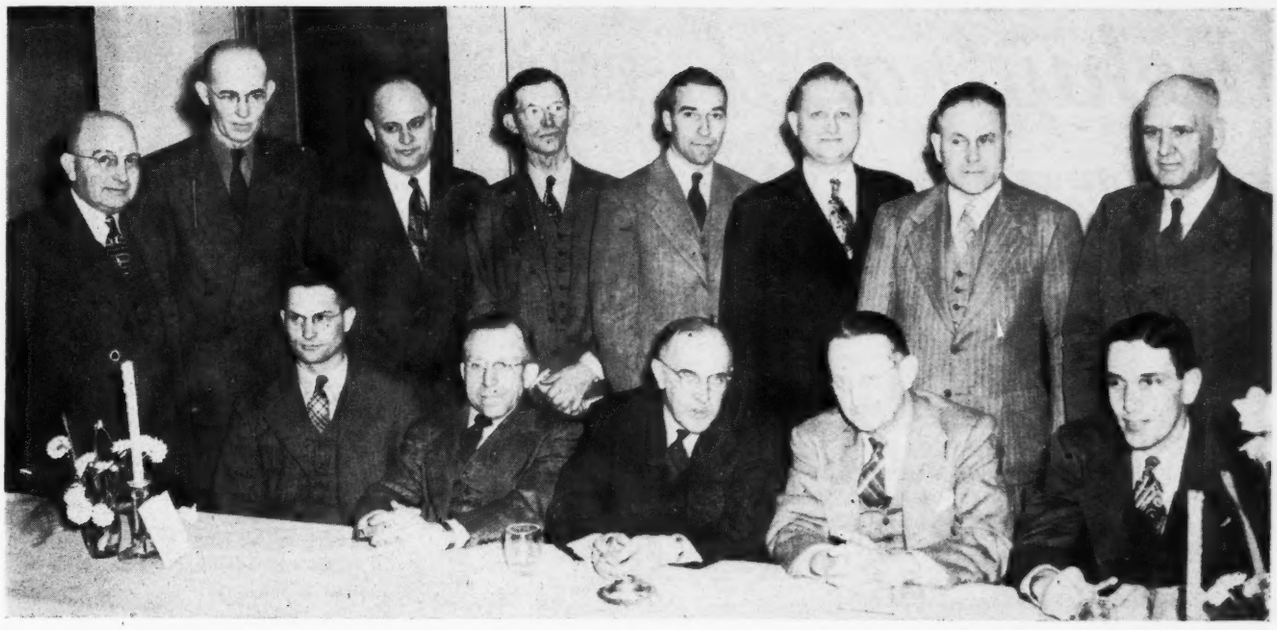
Capital Variety

These three varieties, Mandarin (Ottawa), Kabott and Pagoda, with a range in maturity from 100 to 120 days at Ottawa, have greatly extended the area in which soybeans can be grown in Canada.

More recently a new variety, Capital, has been added to the group. Capital originated from a cross between strain 171 x A.K. (Harrow) made in 1935. Strain 171 was a selection obtained from a mixed lot of seed received by the Division of Forage Plants, Ottawa, in 1931 from J. L. North, Royal Botanic Gardens, London, England and was collected in the vicinity of Sochentze, east of Harbin, Manchuria. Capital is taller, earlier and slightly higher in yield than Mandarin. It has already become very popular so that the demand for seed greatly exceeds the supply.

During the entire period that the breeding program has been in progress attention has always been given to the quality of the beans produced by all strains and varieties. Processing plants have found all of the varieties developed at Ottawa highly satisfactory for milling purposes and Canadian grown beans are in great demand because of their high quality.

The breeding work at Ottawa is still in progress. Improvement is constantly being sought through introduction, selection, and hybridization, and there are many evidences that continued progress is being made. Even now final tests are being conducted with new strains and it is confidently expected that the best of these will be superior to some of the older varieties released from this Station during the early years of the breeding program.



Some of the men taking part in the 8th annual Van Wert County soybean roundup. Seated, left to right: Dale Wortman, Wortman Bros. Implement Co., Van Wert; Gus Holland, Holland Pioneer Mills, Ohio City; Ersel Walley, president American Soybean Association, Ft. Wayne, Ind.; Ward Calland, Central Soya Co., Inc., Decatur, Ind.; and R. S. Oetzel, chairman Van Wert County Soybean Committee, Van Wert. Standing, left to right: L. A. Gilliland, Gilliland Grain Co., secretary Van Wert Soybean Committee, Van Wert; Rey Duprey, farmer, Van Wert; L. C. Holtkamp, Van Wert County agricultural agent; L. W. Adam, secretary Van Wert County Seed Improvement Association, Rt. 1, Delphos; John Leonard, vocational agriculture department, Marsh Foundation school, Van Wert; D. C. Robinson, Ohio State University extension service; W. G. Weigle, manager Marsh Foundation Farms and vice president American Soybean Association, Van Wert; and John Slipher, soil conservationist, Ohio State University.

Praise Van Wert's New King of Crops

Two hundred area growers and agricultural business men heard Van Wert County's new king of crops, the soybean, extolled January 27 at Van Wert, Ohio.

The event was the eighth annual Soybean Round-up and dinner sponsored by the Van Wert County Seed Improvement Association, the Van Wert County Soybean Committee and the agricultural extension service.

R. S. Oetzel, soybean committee chairman, presided. He introduced the speakers and announced that it is estimated the county's nearly million bushel soybean harvest last year represented a cash gross income of 4 million dollars in farmers' pockets.

"The soybean as a major crop is here to stay" predicted Ersel Walley of the Walley Agricultural Service, Fort Wayne, Ind., and president of the American Soybean Association.

To support his belief, Walley cited the increase of several million in population in the last few years, the fact that the newer generation is eating better, and the great foreign demand for whole beans and their products. He added that the soybean is the only hope for a hungry world because it helps to a great degree to fill the protein needs to produce other foods.

Stating that he saw a need, as president of the soybean association, for protecting the growers of the future, Walley cited what the association has accomplished in the past and some of the problems ahead in the future, such as tariffs, use of bean oil in mayonnaise, export of whole beans and the fight to permit the coloring of margarine which the soybean interests favor.

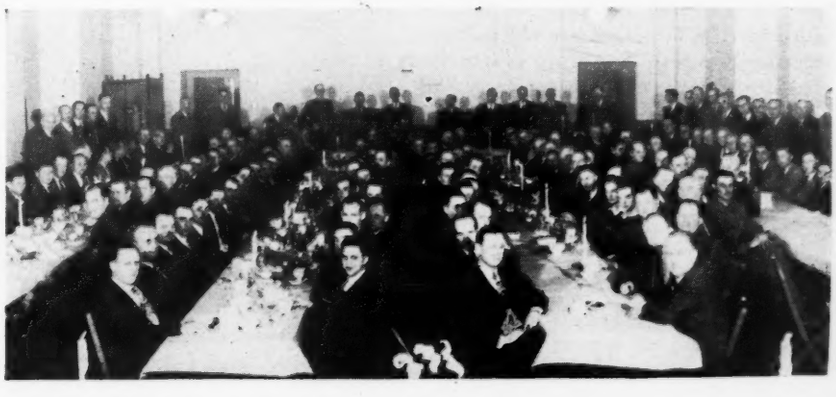
Regarding the latter issue Walley said it was to the interest of all farmers to permit the selling of colored margarine, especially when soybean oil is being used in it, because the dairy farmer must depend on the soybean grower for his chief supply of protein feed. Walley warned that soybean and margarine interests must work together to get the margarine coloring tax removed lest the consumer force the removal of all controls and permit the cheaper coconut oil to replace soybean oil.

Walley cited statistics to prove the growing importance of the soybean as a major crop and of its products as a major industrial factor.

Ward Calland, director of agronomic research for Central Soya Co., Decatur, Ind., and trustee of Purdue University, traced agricultural progress through the past 25 years, including the agricultural engineer who developed tools and equipment, the plant pathologist who improved crops and the organic chemist who developed new products from crops.

"The wonders of magic farming are unlimited," Calland said. "There is only one trouble—most of us will only get to look on. What an opportunity boys have in agriculture!"

The annual Van Wert soybean dinner climaxing the Roundup.



Dehydrated GREEN VEGETABLE SOYBEANS

By JOSEPH S. CALDWELL, CHARLES W. CULPEPPER, MARGARET C. HUTCHINS, BOYCE D. EZELL and MARGUERITE S. WILCOX

Division of Fruit and Vegetable Crops and Diseases, Bureau of Plant Industry, Soils and Agricultural Engineering, Agricultural Research Administration, U. S. Dept. of Agriculture.

Introduction

APPROXIMATELY 125 varieties of soybeans are classified by Japanese horticulturists as garden vegetables and are grown specifically for use as human food. Thorough tests of these in the United States have shown that some 25 are fairly well adapted to conditions in some or most of the important soybean-producing districts and that they combine satisfactory yields and good to excellent quality as fresh green beans.

Canning of vegetable soybeans on a commercial scale is assuming some importance. The number of canners reporting soybeans in the list of products packed increased from 7 in 5 states in 1940 to 23 in 12 states in 1944, but was reduced to 16 in 10 states in 1946[1] and to 16 in 8 states in 1947. Commercial freezing of soybeans, either alone or in combination with sweet corn as succotash, has very recently been begun by a few operators.

The wide adaptation of vegetable soybeans to cultivation, and their acceptability and especially their high nutritive value as fresh vegetables, which exceeds that of any other fresh legume[2] seemed to warrant a study of the possibilities of dehydration as a means of preserving them. The present paper reports the results of such a study in which most of the more important and widely grown varieties were used.

The primary purpose of the work was to determine the comparative quality of the products obtainable from the varieties employed and the effect of various stages of maturity upon quality, and also to make comparisons of the dehydrated beans, the canned product, and the mature dry beans with respect to flavor and palatability. In order to accomplish these purposes it was necessary experimentally to determine methods of preparatory treatment and drying best adapted to preservation of appearance and palatability of the product. These have been described in detail elsewhere[3]. It was not possible to include preservation of the green beans by freezing, in the present study.

Methods

The material employed in the study consisted of 17 varieties of vegetable or "edible" soybeans, selected for the purpose by Wm. J. Morse of the Division of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering. Mr. Morse also supplied seed of authentic stocks of most of them. Others were obtained from commercial sources; these were checked for trueness to name as the plants approached maturity. In several instances the plants produced from seed of a variety obtained from commercial seedsmen differed appreciably from those grown from the seed stock supplied by W. J. Morse, and the dehydrated products also differed in quality. These are designated in the discussion as "commercial strain" and "authentic strain," and in one case in which two differing strains came from commercial sources, as strains A and B.

All the varieties were grown together on a moderately fertile area of Congaree silt loam on the Plant Industry Farm at Beltsville, Maryland. The area devoted to each variety was 1/20 acre, for a few varieties 1/10 acre. The season was a favorable one and all varieties made good vegetative growth and bore fair to heavy crops.

Each variety was harvested when it was decided from inspection that the largest possible proportion of pods on the plants were at the edible stage and before any appreciable number had begun to turn yellow. Sousei was the first variety to attain this condition; it was harvested September 20, 84 days from planting. Rokusun 17 was the latest, being harvested on October 17, 111 days from planting.

For the first varieties to reach usable maturity, the method of harvesting and shelling was one of picking the pods from the plants by hand, bringing them into the laboratory, spreading on wire trays to a depth of about an inch and steaming for a few minutes to soften the pods, then shelling in a power-driven pea huller equipped with special screens having openings of suitable size. This method proved slow and unsatisfactory, as the pods clung together in masses so that many remained unopened even after two or three passages through the machine, while the empty hulls broke up and tended to clog the screens.

A much more satisfactory and efficient method was consequently adopted; leaves and petioles were stripped from the standing plants, which were then cut off just below the lowest branches, collected, and brought into the laboratory. The plants with attached pods were then chopped up by feeding them through a paper-cutting machine equipped with a heavy knife, which cut stems and branches into sections a few inches in length. The chopped material was then

Green vegetable soybeans in a Tokio market.

A vegetable variety of soybeans, Kanro, at left, and a field variety, Dunfield at right, are compared for size and character.

spread on wire trays to a depth of 3 to 4 inches and steamed for 5 to 7 minutes, after which it was passed through the huller. The presence of pieces of stems and branches greatly aided shelling by preventing matting together of opened and unopened pods and clogging of the screens, with the result that practically complete shelling was obtained from a single passage of the material through the huller. The percentage of beans cut in the process of chopping the plants to pieces was small, not exceeding 3 or 4 percent, and was less than the percentage broken by the repeated passage through the machine that was necessary in shelling the separated pods.

In some preliminary experiments, lots of shelled beans were separated by screening into sizes ranging from 9/32 to 13/32 inch by steps of 1/32 inch, and the various sizes were blanched in flowing steam for varying times and separately dried. Examination of these in comparison with ungraded check lots did not show any advantage from such grading and varying of blanching time with size. All material employed in the varietal comparisons was consequently dried without separation into screen sizes, but each variety was divided into several equivalent lots which were blanched for differing periods. Drying was done in a rapid current of air at 170° F. for the first 4 hours, with reduction to 150° for the remaining 4 to 5 hours of the drying period. Material was removed from the drier with a moisture content of 5 to 5.5 percent, placed in sealed containers, and stored at 70°F. for 4½ to 5½ months before final examination.

Results

Since the plants of all varieties contained pods at all stages of development when harvested, the ungraded shelled beans were composites of various developmental stages. The solids content of the seed is minimum in the smallest sizes and progressively increases with increase in size. The solids content of the ungraded samples of most of the varieties closely approximated 35 percent, which would indicate that the varieties did not differ greatly in their over-all or average stage of maturity. Four varieties, Aoda, Bansei, Kanum, and Rokusun 17, had solids content approximating 38 percent, but were free of yellowed or drying seeds. All varieties were judged to be in optimum condition for use as a fresh vegetable.

The ascorbic acid content of the ungraded samples ranged from a maximum of 35.3 mg. per 100 gm. fresh weight in Jogun 2 to 19.5 mg. in Aoda. The retention of ascorbic acid after drying and storage was low, ranging from 40 percent of the original content down to nearly total loss. Carotene content of the fresh material in no case exceeded 0.3 mg. per 100 gm., was practically constant in all varieties tested, and had nearly completely disappeared after drying and storage.

The dehydrated samples were prepared for judging by refreshing a weighed quantity in a measured volume of water in a refrigerator overnight and cooking for 1 hour in a covered vessel in flowing steam. They were then judged and scored on the factors of color and general appearance, texture, and flavor. These separate scores were then combined to give a single figure expressing the general desirability of the sample.

Comparisons of otherwise identical lots of material blanched for varying periods before drying showed that those blanched for periods less than 8 minutes were invariably firmer in texture and usually less good in flavor than those blanched 8 minutes. Increasing the blanch to 10, 12, or 15 minutes had no significant effects on texture, flavor, or color in comparison with 8 minutes.

Absorption of water in refreshing and cooking varied with variety between 170 and 199 percent of the dry weight, hence the weights of the cooked samples fairly closely approximated those of the fresh beans from which they were made.

Color. In the dry condition, the color of the dehydrated samples varied considerably with variety as a consequence of varying amounts of yellowing or graying. When the samples were refreshed and cooked, much of the differences apparent in the dry material disappeared and the colors of the great majority of them fell within a rather narrow range. None of the material had faded or darkened sufficiently to make it unattractive. Aoda, Emperor, Willomi (strains A and B), Etum, Jogun 2, Sousei, and Wolverine received higher scores than the others, primarily because of the greater uniformity and attractiveness of color in their samples.

Flavor. Grading of the samples on flavor and appeal to the palate was rendered difficult by the very narrow range of differences found among them and the absence of distinctive varietal flavor characteristics. Many of the varieties were so nearly identical in taste as to be indistinguishable. The judges agreed very closely in dividing the varieties into three groups on the basis of palatability and flavor, so that while the differences in average scores between groups are small, they are believed to be significant.

The samples blanched 8 minutes were in the majority of cases slightly superior in flavor to the corresponding lots dried without blanching, but in a few instances the reverse was true. Rather oddly, the two strains of Etum represented the extremes in flavor found in the blanched series, the authentic strain being best, the commercial strain poorest in this respect. Emperor, both strains of Willomi, the commercial strain of Bansei, Hahto, Imperial, and Jogun 2 were all very nearly identical in flavor rating and all slightly less pleasing than the true Etum. Bansei (authentic strain), Wolverine, Rokusun 17, Aoda, Sousei and Kanro made up a group whose members were not quite as good as those of the last group. Giant Green, Tastee, Kanum, and the commercial strain of Etum had no objectionable or foreign flavor, but received the lowest scores because

• *The authors compared most of the leading vegetable varieties of soys in three forms: canned green, dehydrated green and mature dry beans. Teses were made for flavor and desirability.*

Again BREAKING RECORDS

It's becoming a habit with NOD-O-GEN . . . to smash inoculator sales records for Seedsmen . . . to break crop records for legume growers. This steady preference-swing to NOD-O-GEN stems from its 34-year reputation for top-quality, top results.

Users know and trust NOD-O-GEN as a bacteriologically pre-proven product . . . a legume seed inoculator that's super-charged with selected bacteria of uniformly high count and nitrogen-fixing potency . . . a product that unfailingly returns many dollars for its few-cents-an-acre cost.

That's why NOD-O-GEN sells readily, why you'll be doing a good turn profit-wise, for your customers and yourself, when you stock it. Your jobber can supply you . . . or write direct.

Prepare for Heavy Weed Killer Demand

You can profitably include many of the following items with your Nod-O-Gen order. They are all popular sellers at good margins.

2, 4-D WEED KILLERS
Liquid or powder forms. Regular strength and concentrates. A complete assortment.

HORMONES
Fruitone, Rootone, Transplantone, Tubertone.

SEED TREATMENT CHEMICALS
Ceresan, Arasan, Tersan, Semesan Bel, Semesan Jr., Spergon, Barbak.

RAT KILLERS
Tat Formula "83" containing ANTU.

SOIL-TESTING KITS
Sudbury—Wide range of sizes.

SPROUT INHIBITORS
Barsprout for all root crops, particularly potatoes, enables storage of "old" potatoes well up into spring.

FERTILIZER
Ford Ammonium Sulphate.

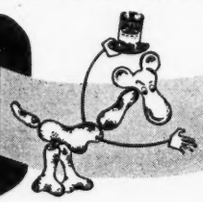
SPRAYERS
"GAT" sprayers for home lawn use.

FARM LABORATORY DIVISION

THE ALBERT DICKINSON CO., Chicago 90, Ill. P.O. Box 788

SOUTHERN OFFICE AND WAREHOUSE: 3013 N. State St., Jackson, Mississippi Founded 1854

NOD-O-GEN

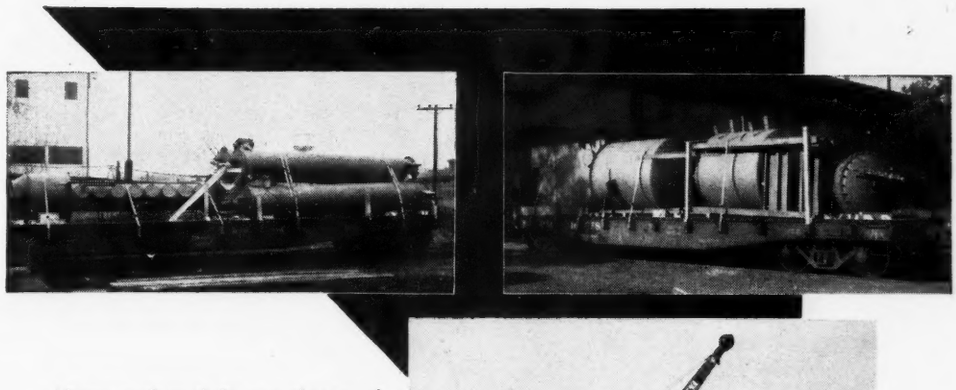


The Pre-Tested Inoculator
The Crop and Profit "Pepper Upper"

WHY

Anderson Solvent Extraction Units

COST LESS

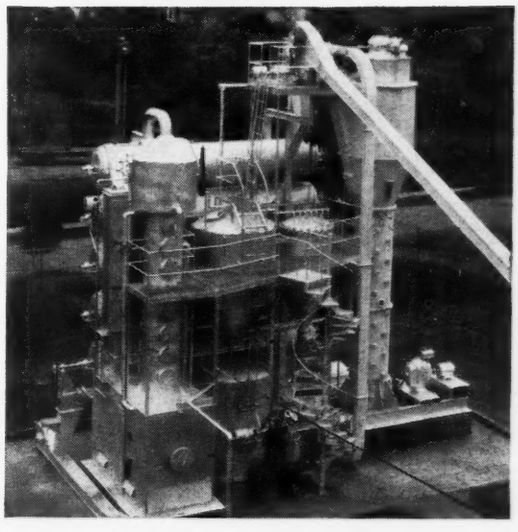


Above and to right are photos of the three flat cars comprising one complete 70 ton Anderson Solvent Extraction Unit as delivered, ready for installation.

● One of the reasons why Anderson Solvent Extraction Units cost you less money is because they are so easy to install. Pre-fabricated, the Unit is shipped to your site in assemblies that are easily installed and connected together.

Unique design makes the Anderson Unit a packaged unit—with most of the installation a factory job. Site installation consists of moving the various parts over to the desired location, setting in place, connecting parts. That is why you save approximately 80% of the normal installation cost when you choose an Anderson Solvent Extraction Unit.

And that's not *all*—Anderson Solvent Extraction Units do not need a building. This saving, plus saving through pre-fabrication, gives an overall saving in installation cost of 80%. Let us tell you more about Anderson Solvent Extraction Units.



THE V. D. ANDERSON COMPANY
1976 West 96th Street • Cleveland 2, Ohio

ANDERSON EXPELLERS & SOLVENT EXTRACTION EQUIPMENT

of their tastelessness and lack of appeal to the palate. The grouping of the varieties with respect to flavor was essentially unchanged when the unblanched samples were compared, with two exceptions. Rokusun 17 was decidedly the poorest, Willomi (strain A) was slightly the best, of the unblanched series.

Texture. The range of differences in texture was wider than that in color and flavor, extending from very good to definitely poor. Willomi (strain A) was definitely best of the series of samples with Etum (authentic strain) ranking next. Emperor, Hahto, Imperial, Tastee, Sousei, and Willomi (strain B) constituted a group that were practically indistinguishable in texture and distinctly not as good as Willomi (strain A), but slightly better than Jogun 2. Aoda, Bansei, the commercial strain of Etum, Kanro, and Wolverine made up another group that were indistinguishable in texture and all somewhat inferior to the group containing Emperor and Hahto. Kanum, Rokusun 17, and Giant Green were least satisfactory in texture, being firm and hard, Giant Green especially so. This characteristic was common to all samples of these varieties regardless of length of blanch.

Comparative Desirability

In their overall scores on comparative desirability, all factors of quality considered, the varieties ranged from very good down to fair or just passable. They fall into five groups, as follows:

Best, Willomi (strain A) and Etum (authentic strain).

Second. Emperor, Imperial, Jogun 2, Willomi (strain B).

Third. Hahto, Aoda, Sousei, and Bansei (commercial strain).

Fourth. Bansei (authentic strain), Kanum, Kanro, Wolverine, and Tastee.

Poorest. Giant Green, Etum (commercial strain), and Rokusun 17.

The differences in scores separating the groups are rather small and might seem doubtfully significant were it not for confirmatory evidence from the series dried without blanching and from that dried after blanching for periods shorter and longer than 8 minutes. In every case, regardless of the treatment given the material prior to drying, the varieties scoring highest in overall desirability were Willomi (both strains), Etum (authentic strain), Emperor, Jogun 2, and Imperial; those receiving lowest scores were Giant Green, Rokusun 17 and the commercial strain of Etum. The other varieties consistently made up a group standing in intermediate position between the high group and the low one.

Within each of the three groups, the varieties varied somewhat in position in relation one to another, but the difference was never great enough to transfer a variety into a higher or lower group. That is to say, the judges consistently scored the varieties in essentially the same order with respect to their quality in each of several series of samples that had received different preparatory treatments before drying.

This is rather conclusive evidence that the differences in ratings of the groups express actual although rather small differences in inherent quality and palatability between the three groups of varieties. Within the individual groups, the differences are probably not significant. There was adequate evidence that the differences in quality were not due to differences in maturity of the varieties.

Comparative Quality of Canned Green Beans

The original plan of the work contemplated the canning of material of each of the varieties for comparison with the dehydrated product. Lack of time made it impossible to carry out the plan with more than three varieties, Emperor, Hahto, and Rokusun 17. As these varieties were prepared for drying, a portion of the ungraded material of each was taken as it came from the sheller, repeatedly washed, filled into No. 2 enameled cans, and covered with boiling 2 percent salt solution. The cans were exhausted 10 minutes in flowing steam, sealed, processed for 60 minutes at 240° F. and cooled in air. They were stored at 70° until brought out and opened for comparison with the dehydrated products.

Comparisons were difficult for the reason that the canned and dried products of the same variety were so dissimilar. The dried product retained much of the characteristic flavor of the fresh beans; in the canned, this was lost and replaced by an altered "canned" flavor which was much less appealing to all the judges.

Emperor had retained very good green color, the other varieties had faded to unattractive yellowish brown or olive brown.

Texture was tender and agreeable in all three varieties, but the poor color of Hahto and Rokusun 17 and the alteration in flavor in all three led the judges to the unanimous decision that the canned samples were very decidedly inferior in appearance, flavor, and palatability to the dehydrated products made from portions of the same material. It may be noted that the canned material compared very favorably with experimental packs of canned soys of these and other varieties that the writers have examined, and were superior to most of the commercially canned beans they have seen.

It was the opinion of the judges that the poorest material of the dehydrated series would in all probability be preferred by consumers over the canned beans, by reason of its better color and much better retention of "fresh" flavor.

A factor in favor of the canned product, as compared with the dehydrated material, is that there is considerably less destruction of ascorbic acid in canning than in drying.

Comparative Quality of Mature Dry Beans

Part of the planting of each of the varieties, with the exception of Sousei and the authentic strain of Etum, was allowed to stand until the plants were defoliated by frost and the pods had become mature and air-dry. The beans were then harvested, shelled, placed in the dehydrator for a few hours at 100°-110° F. to complete the drying, and stored in bags at 70° until the examination and grading of the dehydrated material. Portions of the mature dry beans were then prepared and cooked for examination and scoring in direct comparison with the dehydrated products. Such comparisons should indicate whether dehydration of green beans yields products sufficiently superior in flavor and attractiveness to the mature dry beans to justify the additional expense and reduction in yield involved in drying the immature beans.

It was found that the method of cooking used with the dehydrated beans was inadequate for the mature air-dry beans; they absorbed water slowly in refreshing and were underdone and hard in texture after 60 minutes of steaming at 212° F. Cooking for 30 minutes in a retort at 10 pounds steam pressure (240° F.) after refreshing overnight resulted in complete cooking and desirable texture, although water absorption was always distinctly lower than in green-dried beans.

Color. In the dry condition, the colors of the mature samples were much duller and less attractive than those of the corresponding green-dried lots, chiefly as a result of fading and yellowing. When cooked, the series cooked at 240° F. showed more breaking and slipping of skins, more fading of green color, and more rapid darkening and browning after cooking, than those cooked at 212° F.

These effects were not serious enough in any of the varieties to make them unacceptable, and were more than offset by the pronounced improvement in texture resulting from cooking under pressure. Aoda, the two strains of Bansei, the commercial strain of Etum, Wolverine, and Willomi (strain B) received identical ratings on color and appearance and were distinctly superior to the others. Jogun 2, Emperor, Kanro, Rokusun, Willomi (strain A), Imperial, and Kanum were less attractive than the first group; and Giant Green, Hahto, and Tastee were poorest of the series in appearance and color. The presence of a rather prominent black eye in Giant Green, Hahto, and Tastee detracted somewhat from their appearance.

Flavor. The effects upon flavor of processing under pressure as compared with cooking at 212° F. were somewhat variable. In

about half the varieties, processing under pressure resulted in improvement in flavor. This was especially pronounced in Hahto, Jogun 2, Rokusun 17 and Aoda. In a number of varieties, including Giant Green, Kanro, Kanum, and Tastee, the scores of the samples cooked at 212° and at 240° were identical. In still others, including Emperor, Etum, and Willomi, the flavor of the samples cooked under pressure was slightly less good than that of the corresponding checks.

The ratings on flavor fell within a very narrow range, many of the samples being indistinguishable. Wolverine, Willomi (strain B), Etum, Kanum, and Rokusun 17 were slightly better than the others but were closely followed by Bansei (commercial strain), Jogun 2, Giant Green, Hahto, and Willomi (strain A). The authentic strain of Bansei, Kanro, Imperial, and Tastee made up a third group following closely after the second, and Emperor and Aoda were lowest in their scores on flavor.

Texture. Processing under pressure produced decided improvement in texture of all the varieties over steaming at 212° F. Improvement was greatest in Aoda, Giant Green, Imperial, Hahto, Jogun 2, and Rokusun 17, which were so hard as to be doubtfully acceptable when cooked at 212°.

Most of the samples that had been cooked under pressure were very good to excellent in texture and so nearly alike that it was difficult to arrange them in order of excellence. Rokusun 17 was very slightly superior to the others, but was closely approached by Etum (commercial strain), Wolverine, Willomi (strain B), Imperial, Kanro, and Bansei (commercial strain), which were indistinguishable in texture. They were slightly better than another group whose members were also indistinguishable in texture, and which was made up of Emperor, Jogun 2, Tastee, Willomi (strain A), Bansei (authentic strain), Giant Green, Hahto, and Kanum. One variety, Aoda, was distinctly poorer in texture than the others.

Comparative desirability. The very close similarity of the mature dry samples in all the factors considered in the grading resulted in over-all scores on comparative desirability ranging from excellent to very good, and most of the varieties fell in the upper half of this range. There was very good agreement of the judges upon the individual scores on the various factors for the different varieties as well as on the final averages, which indicates that the differences in scores represent actual differences between samples and not random errors on the part of the judges. The amounts of these differences in many cases indicate that while they actually existed in this particular series of samples, they are not significant since they probably would not be duplicated if the work were repeated in another season.

Wolverine and Willomi (strain B) were rated highest in comparative desirability, which resulted from the fact that both were

exceptionally good in both texture and flavor. Etum (commercial strain), Rokusun 17, Bansei (both strains), Imperial, Jogun 2, Willomi (Strain A), Kanro, Kanum, and Giant Green were slightly less desirable. The remaining varieties, Aoda, Emperor, Hahto, and Tastee, were distinctly lower in quality, chiefly because of rather poor flavor in Aoda, hardness of texture in Emperor, and unattractive color in Hahto and Tastee. These were minor defects and would not have hindered the ready acceptance of the products by consumers.

There is very little correlation between the rankings of the different varieties on comparative desirability as dehydrated green beans and on desirability as mature dry beans. Wolverine, Rokusun 17, and the commercial strain of Etum, which were least desirable when dehydrated in the green state, were most desirable as mature beans. Conversely, Emperor, Hahto, and Aoda, which were very good to good as dehydrated green beans, were poorest of the series as mature dry products. Willomi (strain A) was excellent in the dehydrated green state, inferior to several other varieties when matured dry. Kanum and Kanro occupy approximately the same midway positions in the two lists, and Tastee and Giant Green are low in quality in both. It must be remembered, however, that low ranking in either series does not denote that the material was unacceptable as a food product, since all varieties were acceptable in both forms, but merely that it was less palatable and desirable than others of the series.

The range in quality in both the green and the dry beans was so narrow and the differences between varieties so small that it is doubtful that the varieties would fall in the same order in their scores on quality if the work were repeated for another season in the same location, and extremely doubtful whether they would do so if the location of the work were changed.

While most if not all of the varieties here used are adaptable to cultivation under a rather wide range of soil and climatic conditions, differences in these conditions affect the quality of product to such a degree that there is no agreement among workers in different producing areas as to comparative quality of the different varieties. Lloyd and Burlison[4], working at Urbana, Ill., compared the table quality of 18 varieties of green soys, seven of which were used in this work. Five of these, Jogun 2, Willomi, Imperial, Wolverine (80490-1), and Emperor were rated very good, the other two, Giant Green and Bansei, as good.

Weiss and coworkers at the Iowa Station[5,6] determined the comparative palatability of 89 green vegetable soybeans. Eleven of those varieties used also in this work received grades on palatability ranging from 8.8 down to 5.3 on a scale in which 10 was perfect. In order of decreasing desirability they were Kanro, Sousei, Jogun 2, Giant Green, Bansei, Etum, Kanum, Wolverine, Willomi, Tastee, and Imperial. The work extended over several years and the order of desirability of the varieties varied somewhat from year to year.

Walls[7,8] employed material grown at the University of Maryland Farm, a few miles from the place at which the present authors grew their material, in a study of comparative quality of canned products of 9 varieties continued for 2 years. Six of the varieties used in the first year and seven in the second year were also used in the present tests. In order of excellence, Emperor, Bansei, and Giant Green ranked first, second, and third, Jogun 2, Imperial, and Willomi sixth, seventh, and eighth in the first year's trials; in the second year, Emperor was first, very closely approached by Willomi and Jogun 2, with Giant Green, Imperial, Sousei, and Bansei ranking sixth, seventh, eighth, and ninth. It will be noted that while Emperor was first in both years, Bansei was nearly as good in the first year but quite poor in the second, while the exact opposite was true of Willomi. Similar but less pronounced shifts of position in the series occurred with other varieties. This suggests strongly that rela-

tive ranking in both years was determined largely by seasonal conditions.

Sherman and Albrecht[9] compared the eating quality of the mature dry beans of 29 varieties grown at Auburn, Alabama. Rokusun was one of three rated very good, Emperor one of three rated good, Imperial and Bansei were among the fifteen rated fair, and Giant Green, Willomi and Jogun 2 were included in the group of eight termed poor.

Several workers have made recommendations of varieties for freezing. Plagge and Lowe[10] recommend Bansei, Higan, Hokkaido, and Willomi for the purpose in Iowa; Carlton[11] lists Aoda, Bansei, Easy Cook, and Rokusun for Tennessee; Winter and Hustrulid[12], working in Minnesota, found Emperor and Kobbot best, with Giant Green, Bansei, and Sousei also good. For Washington, Davis, Muir, and Sperry[13], and Clore[14] recommend Bansei.

There is need for further investigations employing large groups of the more widely grown varieties, since most of the workers just named emphasize the high quality of the frozen product.

The lack of agreement as to comparative quality of the various varieties among investigators in various parts of the eastern United States shown by the results just cited makes it evident that there is no "best" variety of vegetable soybean. The fact that all the varieties named were of acceptable quality as grown at these various locations indicates that differences between varieties are largely and chiefly differences in adaptation to soil and climatic conditions rather than constant differences in inherent quality.

Consequently it may be anticipated that each producing district will find that certain varieties especially adapted to the local growing conditions will consistently produce beans of somewhat better quality than others; and that the list of such superior varieties will differ more or less widely from that for every other district.

Comparison of Dehydrated, Canned, and Mature Dry Soybeans

Direct varietal comparisons of quality between dehydrated or canned green soybeans and the mature dry beans cannot be made for the reason that they are three quite dissimilar products. The dehydrated green beans, when cooked, preserve the characteristic flavor and texture of the freshly cooked green beans to a very considerable degree, and the quality of a group of varieties will be measured largely by the degree to which the different samples resemble the fresh product.

In canning, resemblance to the fresh product is entirely lost as a consequence of changes in color and texture and more especially in flavor. The result is that the material may not appeal to people who are fond of the fresh product. The canned beans consequently cannot be judged on the basis of their likeness to the fresh. Comparisons between different canned samples can be made only upon the basis of standards developed out of study of the canned samples themselves.

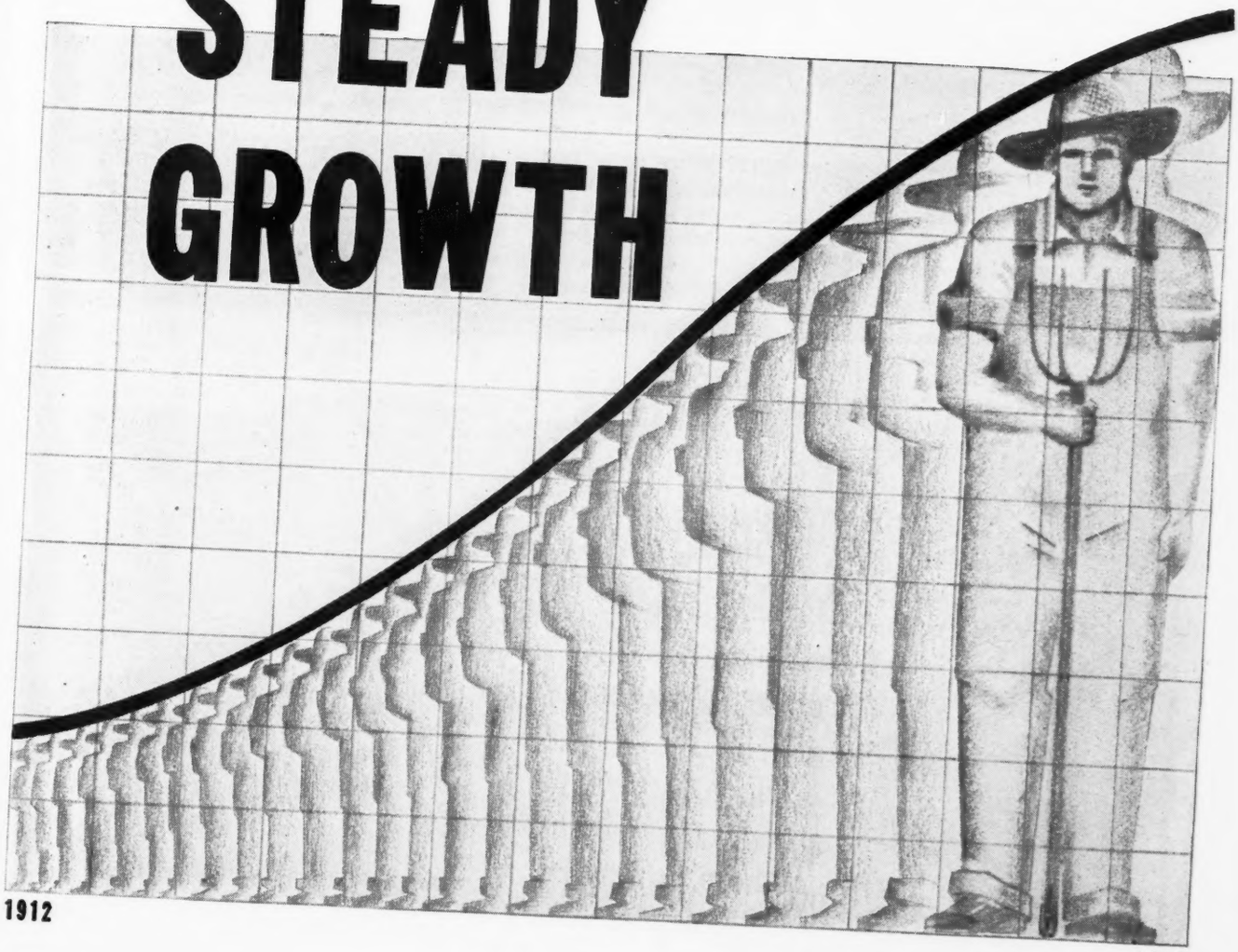
Mature dry soybeans yield a cooked product of still different character. The texture becomes much firmer and more nut-like than that of the green bean, and green color is partially or wholly changed to yellowish-green or olive brown. The greatest alteration, however, is that occurring in flavor. In the course of ripening, the seeds gain in protein and fat content and lose a considerable part of the sugars present in the green state, probably by conversion into fat. The characteristic "green" flavor, which is in some varieties so pronounced as to be undesirable, becomes much milder or disappears.

In consequence of these changes the mature beans are much less sweet, and the flavor becomes one which suggests that of chestnuts to some consumers, that of popcorn to others. Little or nothing suggestive of the bean in the green state is present in the mature dry state. For this reason the varieties of cooked dry beans can be directly compared as to quality and palatability only among themselves and not with the dehydrated or canned green products.

The fact that canned, dehydrated, and mature dry soybeans are quite dissimilar products does not prevent the formation of conclusions as to the comparative attractiveness and appeal to consumers of the three types of product. It does result in wider latitude for expression of individual likes and dislikes on the part of the judges com-

SEEDBURO'S STEADY GROWTH

SEEDBURO QUALITY



1912

1948

Means More for Your Money—

For 36 years Seedburo has grown steadily in ability to serve customers . . . to give more value for every dollar received.

(1) Through growth in number and variety of items handled, Seedburo has become headquarters for seed and grain testing and handling equipment. (2) The addition of related equipment has enabled buyers in the trade to get more and more of their needs from one source . . . it has brought the savings and conveniences of purchases concentrated with one supplier. (3) The steadily enlarged field force has brought personal contact and assistance to more and more buyers. (4) An expanding office staff has improved the service on inquiries and orders. (5) Consistent growth in number of satisfied customers is evidence of Seedburo's ability to satisfy you now.

OVER 500 ITEMS of equipment and supplies for; (a) testing and grading seed and grain, (b) handling seed and grain, (c) plant operation and maintenance.

SEEDBURO
EQUIPMENT COMPANY

729 CONVERSE BUILDING • CHICAGO 6, ILLINOIS.

paring the material. In the present instance the judges were in entire agreement in their over-all ratings of the three types of product.

The number of samples of canned beans prepared in the present work was quite limited. Through the courtesy of E. P. Walls and associates of the department of horticulture of the University of Maryland, the writers participated in the examination and scoring of the canned varietal material reported upon by Walls[7 8]. They consequently have a fair degree of familiarity with the general character of canned green vegetable soybeans of many or most of the varieties here used. They were unanimous in considering the canned beans, as a class, rather unattractive in color and appearance and decidedly lacking in desirable flavor and appeal to the palate. While varieties differed somewhat in all these respects, none of them was considered equal in palatability to the dehydrated product of the same or other varieties.

The dehydrated products, as a class, were preferred over the canned material chiefly because they retained much of the characteristic flavor of the fresh green beans, which the canned samples failed to do. This fresh flavor was considered much more desirable and appealing than the characteristic "canned" taste of the canned product. It is believed that consumers who are familiar with the soybean as a fresh vegetable would prefer the dehydrated beans over the canned product.

Mature dry beans, as a class, had a characteristic mild, nut-like flavor and the rather strong "beany" taste of some varieties, fresh or dehydrated, was never present. This mature nut-like flavor was somewhat more attractive and pleasing, in the opinion of the judges, than the flavor of the dehydrated green beans, and they considered that most consumers tasting both products for the first time would prefer the mature beans. On the contrary, those who are familiar with the fresh vegetable would prefer the dehydrated product rather than the mature dry bean.

No comparisons between dehydrated and frozen beans were possible in the present study.

Bibliography

[1]National Canners' Association, Canners' Directory for the years listed.

[2]Chatfield, Charlotte, and Adams, Georgian, 1931. Proximate Composition of Fresh Vegetables. U. S. Dept. Agric. Circ. 146, 24 pp.

[3]Caldwell, Joseph C., Culpepper, Charles W., Hutchins, Margaret C., Ezell, Boyce D., and Wilcox, Marguerite S., 1947. Dehydration of Green Vegetable Soybeans: A Comparison of Quality in Nineteen Varieties and Strains with That of Green Canned and Mature Dry Beans. The Canner 105, Nos. 10, 11, 12, 13, Aug. 30-Sept. 20.

[4]Lloyd, J. W., and Burlison, W. L., 1939. Eighteen Varieties of Edible Soybeans, Univ. Ill. Agric. Expt. Sta. Bull. 453: 385-438, ill.

[5]Wilsie, C. P., Nelson, P. Mabel, and Lowe, Belle, 1940. Testing Soybeans Suitable for Use as Green Vegetables for Human Consumption. Iowa Agric. Expt. Sta. Report on Agric. Research. Year ending June 30, 1939, Part 1, pp. 66-67.

[6]Weiss, Martin G., Wilsie, Carroll P., Lowe, Belle, and Nelson, P. Mabel, 1942. Vegetable Soybeans. Iowa Agric. Expt. Sta. Bull. P. 39 (New Series): 381-395, ill.

[7]Walls, E. P., 1942. Yield and Quality Tests of Edible Soybeans Grown for Canning in Maryland. Proc. Am. Soc. Hort. Sci. 40: 441-444.

[8]Walls, E. P., 1943. Edible Soybeans, Md. Agric. Expt. Sta., Misc. Pub. 28, 7 pp.

[9]Sherman, W. C., and Albrecht, H. R., 1942. Edible Soybeans. Ala. Agric. Expt. Sta. Bull. 255, 16 pp.

[10]Plagge, H. H., and Lowe, Belle, 1942. Preservation of Fruits and Vegetables by Freezing in Refrigerated Locker Plants. Iowa Agric. Expt. Sta. Bull. P. 46 (New Series), pp. 485-528.

[11]Carlton, Harry, 1945. Home-Preparation of Fruits and Vegetables for the Freezer-Locker. Tenn. Agric. Ext. Service, Expt. Sta. Bull. 168, Revised. 16 pp.

[12]Winter, J. D., and Hustrulid, A., 1945. Freezing Foods for Home Use. Minn. Agric. Expt. Sta. Ext. Bull. 244, Revised.

[13]Davis, Eleanore, Muir, Joseph, and Sperry, Thyrza A., 1946. Freezing Farm Products. Inst. Agric. Sciences State College Wash. Unnumbered Ext. Bull., Revised.

[14]Clore, W. J., 1945. Lima Beans and Green Edible Soybeans for Freezing from Central Washington. Western Canner and Packer 37, No. 3, pp. 51, 52 61. March.

—sbd—

BRITISH CONTRACT

Chemical plants division of Blaw-Knox Co., Pittsburgh, has received a contract from Lever Brothers and Unilever Ltd., of London, England, to design and construct a plant using the Emersol Process for the production of stearic and oleic acids. These products in turn will be used for cosmetics, chemical intermediates, candles, cutting oils, lubricants, rubber compounding and special soaps.

The plant will be located in England.

SAYS FAT PRICE TO STAY UP

Growers probably can figure on oil crop prices staying high for the rest of the 1947-48 marketing year, though not necessarily at the November level, states E. L. Burtis, of the Bureau of Agricultural Economics in the *Agricultural Situation*, published before the recent market break.

Oilseed prices may fall moderately in 1948-49, because of increased world supplies of fats and oils, but will remain high in relation to most years, says Burtis.

Over the longer term, expanding world output is likely to pull down the prices of fats, oils and oilseeds. But no slump like that after World War I is in prospect.

Support prices for flaxseed, soybeans and peanuts grown in 1948 probably will all be above wartime levels.

Total production of fats and oils from domestic materials in 1947-48 may be up slightly. The cottonseed and flaxseed crops were much larger in 1947 than in 1946, which means more cottonseed oil and linseed oils in 1947-48. However, these gains will be nearly offset by lower production of lard, grease, tallow, and soybean oil. The reduced corn crop in 1947 will result in slaughter of hogs at lighter weights and a reduced yield of lard and grease per animal. Cattle slaughter is expected to decline because of the fewer cattle on farms.

Domestic Output Up

Domestic output of fats and oils in the next few years probably will continue above prewar, if prices for fats and oils stay relatively strong. Good prices for fats and oils would help to hold soybean oil production far above the prewar rate. Output of butter and cottonseed oil probably will tend to rise. On the other hand, production of linseed oil from domestic flaxseed may sink to prewar levels if imports of Argentine flaxseed (either as seed or as linseed oil) become readily available. The reduced cattle slaughter expected in the next few years will cut tallow output, but probably not to the prewar level. Lard output may average about the same as in the last year or two.

Prices for soybeans are likely to be high at least until mid-1948, according to Burtis. Domestic demand for fats and oils is strong. Prices for soybeans so far this crop-year have been $3 to $4 a bushel, compared with a wartime ceiling of around $2.10 per bushel and the prewar average of about $1.

Export demand for soybeans and their products is strong. Present legislation authorizes export controls for fats, oils, and oilseeds through February. Supplies of oilseeds available to the European oil-seed-crushing industry are far below prewar.

Only minor amounts of Manchurian soybeans have been shipped to Europe since the war. Manchurian soybeans formerly were one of the big sources of European oilseed supply.

Still Below Prewar

World production of fats and oils is recovering from the low wartime level. However, it is still well below prewar, even though production in the United States is above prewar. Also, consumption has been rising in India and in other areas, adding to the world demand. Supplies are expected to be larger in 1948-49, but still small in relation to demand. Prices probably will go down from present levels, but they will still be much above prewar.

Our shipments of fats and oils to foreign countries and United States territories in 1946-47, including the oil equivalent of soybeans and peanuts for crushing abroad totaled 850 million pounds. This was much less than during the war, but about 350 million pounds above the 1937-41 average.

Exports of soybean oil and soybeans in terms of oil amounted to 119 million pounds, compared with only 41 million pounds prewar.

We are now importing less fats and oils than before the war, and exporting more. This reflects the smaller output in the rest of the world. Production of oils and fats in Europe in 1946-47 was about 35 percent smaller than prewar. Except for olive oil, European production of fats and oils is mostly animal fat.

Imports of fats and oils into the United States in the year beginning October 1946 totaled 1.4 billion pounds, including oilseeds in terms of oil. This was halfway between the wartime average of 0.9 billion pounds annually and the 1937-41 average of 2.0 billion pounds.

The prewar average import was exceeded in 1946-47 by coconut oil and copra in terms of oil, tung oil, and castor oil and castor beans in terms of oil. These items accounted for over 1.0 billion pounds. Most other items were far below prewar. Palm oil imports totaled 63 million pounds compared with 301 million pounds prewar.

Some rise in world's export supplies of oils and fats is likely in 1948. On the other hand, they won't be up to prewar, and probably not in 1949. Net imports of fats, oils, and oilseeds into the United States in 1947-48 probably won't change much in terms of oil from 1946-47.

The situation for oilseed meals is much the same as for fats and oils. The smaller 1947 crops of feed grains will add to the demand in 1947-48 for oilseed meals and other types of feed concentrates. European demand for our oilseed meals is urgent, as supplies from other areas are small. World supplies of oilseed meals will continue less than prewar, at least through 1948.

COMPLETE BORDEN CO. RESEARCH TRANSFER

Transfer has been completed of all soybean research and development activities of the Borden Co. to the headquarters of Borden's Soy Processing Co. at Waterloo, Iowa.

G. F. Kieser, vice president of the Borden Co., made the announcement.

Borden's research into soybeans has been divided among laboratories at Elgin, Ill.; Hampshire, Ill.; New York City and Waterloo.

C. E. Butler, president of Borden's Soy Processing Co., said that the new laboratories just completed at Waterloo will be the scene of an intensified and highly integrated research program looking toward the improvement and development of products made from soybeans.

The newly reorganized research staff of Borden's soybean operation will be headed by Dr. H. N. Brocklesby, as research and technical director. He will be assisted by Dr. F. R. Murdock whose field is animal food products; John Cobler, on special oil products; and George H. Rowland on oil food products.

Dr. Brocklesby has been with The Borden Co. for several years as coordinator of research and development of the special products division. Prior to that time he was chief chemist for the Fisheries Research Board of Canada, Prince Rupert, B.C., for a number of years. He is the author of a textbook, *The Chemistry and Technology of Marine Animal Oils.*

Dr. Murdock has previously been laboratory director for the Borden Vitamin Co., and the animal food division of the Borden Co. Mr. Cobler, until recently head of the Vitamin "A" laboratory of Forbes Laboratories, Inc., was on the pharmacology staff of the Manhattan Project during the war years. Prior to that time he was research chemist for Distillation Products, Inc. Mr. Rowland has been with Borden's Soy Processing Co. for 3 years as director of the Waterloo control laboratory; and was previously employed by Best Foods, Inc.

In accepting the transfer to his division, C. E. Butler pointed out that during the past 15 years the soybean industry has experienced a phenomenal growth as the result of a combination of circumstances which created an almost insatiable demand for soybean products as we now know them; thus enabling the industry to attain its present stature within the space of but a few years. It would be folly, he added, to assume that this situation will continue indefinitely or that those circumstances will ever again be duplicated; if the soybean industry is to maintain its present position in our economy in the years to come, it must spare no effort to improve the quality and utility of its products through a program of continuous and vigorous research.

The men who have located at Waterloo, Iowa, to take charge of Borden's soybean research: (left to right) Dr. H. N. Brocklesby, Dr. F. R. Murdock, George H. Rowland and John Cobler.

New Processing Equipment

Blaw-Knox Co., Pittsburgh, has perfected a new "pressure toaster" or cooker of continuous type for use in heating, cooling or otherwise treating large quantities of materials continuously under pressure (shown above).

In the unit, a horizontal, cylindrical shell rotates inside a pressure chamber. Feed and discharge are accomplished through barrel valves of special design. Perfected and manufactured by Blaw-Knox, these valves allow continuous charging and discharging at pressure up to 15 p.s.i.

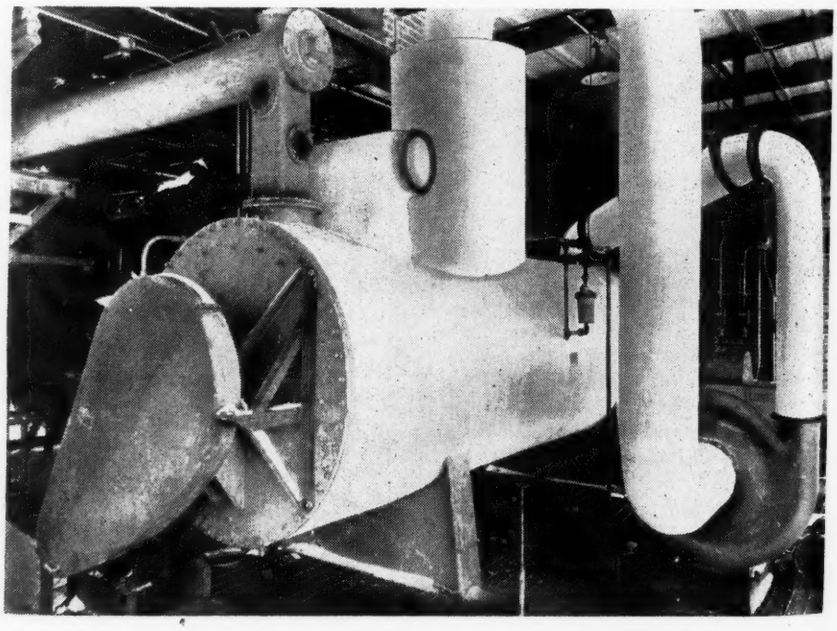
The pressure toaster was originally developed for and is now used by the soybean processing industry; it is expected to find wide application in other fields.

Blaw-Knox Co. chemical plants division announces the marketing of its "Vapor Desolventizer" (below) for plants processing soybeans.

This new unit is a development of Blaw-Knox research that was initiated during the war years. It removes the residual solvent from extracted soybean flakes at a temperature sufficiently low to prevent protein degradation.

All heat is supplied to the system through the use of superheated solvent vapor, thus eliminating metallic heat transfer surfaces and localized overheating of the soybean flake. The resultant advantages are a simpler, more compact unit with appreciable savings in equipment together with lower operating and maintenance costs, as well as higher quality flakes and greater protein yields.

The desolventizer has been designed in standard sizes for daily capacities of 50, 100, 150, 200 and 250 tons of soybeans. Multiple units are used for plants of larger capacity than 250 tons.



GROW BETTER ON MARGARINE

Children grow as well on margarine as on butter, Drs. Harry Leichinger, George Ensenberg and Anton J. Carlson of Chicago report in the *Journal of the American Medical Association* (Feb. 7).

The report, from the University of Illinois College of Medicine department of pediatrics, is of a study aided by a grant from the National Association of Margarine Manufacturers. Terms of the grant provided that findings of the study could be published regardless of results.

Unlike most studies of this type, human children instead of laboratory rats were the subjects.

Two groups of children were included in the study, which covered a period of 2 years, the authors write. One group received only margarine as the table fat in the diet. It was used on bread and vegetables, as well as in the making of pastry and in frying. Fortified margarine was supplied by a number of the companies now manufacturing the product and was the same as that sold to the public. The margarine used was all derived from vegetable fats, and contained no fat from animal sources. The second group of children used only butter for the same purposes.

The margarine group lived in an institution housing 130 children ranging in age from 3 to 16 years.

The butter group was in another institution some 10 miles away. It included 125 children ranging in age from 6 to 17 years, who were mostly orphans.

The diet in each institution was carefully supervised by trained dietitians and so regulated that 25 to 30 percent of the total calories were supplied by fat. The margarine constituted approximately 65 to 70 percent of the total fat calories.

All of the children in both groups were weighed and measured each month under medical supervision. A careful check was made from time to time to be sure that weights and measurements were accurately determined. Routine red blood cell counts and hemoglobin determinations were made on each child after the study was started and again one year later. Specialists in pediatrics supervised the medical care of all the children.

Growth of the group fed margarine, as determined by increases in height and weight, was comparable to that of the children fed butter and to standard height and weight values for the same age group.

Furthermore, it was noted that in the margarine group there was no increase in the amount of illness. Illnesses in general had been on the decline in the margarine group for the last 4 or 5 years, and this decrease in the incidence of illness continued during the period of the study. This compares with conditions present in the community for the last 5 years.

At no time during the period of the study was it considered that vitamin A played any definite role in the results of the study. The reason, of course, is that all the margarine used contained 15,000 units of vitamin A per pound—which is equal to *or greater than* the amount present in average butter.

Blood studies showed that there were no significant differences between the margarine or butter groups.

The children in the margarine group experienced a high degree of good health during the study, *and in comparing their health to that of the butter group it appears to have been much better.*

When infirmary records are compared it is readily seen that the margarine group fared much better than the butter group. "We are not making any claims that the margarine group were healthier simply because their diet contained margarine," state the authors. "Other variables are more likely to account for their better health."

You can profit by Amsco's experience

Every Amsco extraction solvent is backed by 25 years of know-how—25 years of developing and producing solvents that will do your job as required—dependably, efficiently, and economically.

And today's almost limitless variety of Amsco solvents can be delivered promptly anyplace in the United States.

Every Amsco extraction solvent is also backed by Amsco's famous "service that goes beyond the sale"—your assurance of complete satisfaction.

Here are three more sound reasons why Amsco extraction solvents have what it takes:

1. ***Amsco's high, fast rate of extraction.***
2. ***Low solvent losses—due to close distillation, high initial boiling point, low dry point.***
3. ***Freedom from objectionable residue and odor.***

We'd like to tell you more about what Amsco extraction solvents and services can do for you. For details, mail the coupon today.

THE MOST COMPLETE LINE OF PETROLEUM-BASE SOLVENTS AVAILABLE

Amsco products constitute the widest variety of petroleum solvents available. Every one of them, from oldest to newest, must measure up to the company's 25-year reputation—a reputation for uniform high quality, for prompt service, and for an eagerness to develop new products to meet industry's ever-changing demands.

AMERICAN MINERAL SPIRITS COMPANY
Chicago, New York

LOS ANGELES • PHILADELPHIA • DETROIT • CLEVELAND • MILWAUKEE • INDIANAPOLIS • CINCINNATI
HOUSTON • NEW ORLEANS • ATLANTA • SAN FRANCISCO • BUFFALO • BOSTON • PROVIDENCE
CORPUS CHRISTI • TORONTO • MONTREAL

American Mineral Spirits Company, Dept. SD-9
230 North Michigan Avenue
Chicago 1, Illinois

Please send information on the complete line of Amsco petroleum-base solvents to:

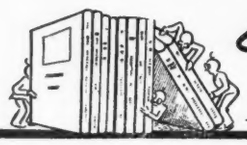
Name.....Position.....

Company.....

Street Address.....

City and State.....

(Samples sent on request)



Publications

Feeding

DO CEREAL GRAINS AND SOYBEAN OIL MEAL INFLUENCE THE CHICK'S NEED FOR AN UNIDENTIFIED FACTOR OR FACTORS PRESENT IN FISH MEAL AND A LIVER FRACTION? By James McGinnis and J. S. Carver, division of poultry husbandry, Washington Agricultural Experiment Station, Pullman, Wash. *Poultry Science*, Sept. 1947.

When a chick is fed a diet that is largely ground corn and soybean oil meal with enough known vitamins added, it still needs something else.

Why? Do corn and soybean oil meal—or the combination of the two—lack something that is peculiar to these items? The authors tried to find an answer to this question in the experiment. New Hampshire chicks were hatched from hens fed a diet in which all the supplementary protein was from soybean oil meal.

The answer seems to be that chicks need the added something whether or not they are fed the corn-and-soybean-oil-meal combination.

Results showed that:

1. Diets containing dried brewers' yeast, B-Y riboflavin concentrate and dehydrated alfalfa for vitamins, and soybean oil meal or ground peas for supplementary protein, gave poor growth and high mortality.

2. But when fish meal and liver fraction were added to these diets the chicks grew faster, and fewer died. These items contain a factor (or factors) the chick needs to keep alive and make greatest growth.

3. The chick's need for the factor in fish meal and liver fraction did not seem to have any connection with the presence of corn and/or soybean oil meal in the diet.

4. In this experiment, ground wheat and ground corn were of equal value when combined with soybean oil meal.

CONDENSED FISH SOLUBLES AS A SUPPLEMENT FOR CORN AND SOYBEAN OIL MEAL CHICK RATIONS. By D. H. Mishler, C. W. Carrick and S. M. Hauge, Purdue University, Lafayette, Ind., in *Poultry Science*, Sept. 1947.

An experiment with young chicks. Levels of 30, 35, and 40 percent soybean oil meal; and .5, 1, and 1.5 percent condensed fish solubles (dry basis) were used. Only other ingredients in the rations were corn, synthetic riboflavin, A and D vitamin oil and a simple mineral mixture.

The chicks grew well on all combinations of 35 and 40 percent soybean oil meal, and 1 and 1.5 percent of the fish solubles. They grew best on the highest levels of each product.

In another experiment chicks made excellent growth on a ration of 58.5 percent corn, 36 percent soybean oil meal, and 1.5 percent fish solubles and synthetic riboflavin. They grew significantly better when niacin, calcium pantothenate, choline chloride and methionine were added.

When fish solubles and riboflavin were compared with the four synthetic vitamins and methionine, the results highly favored the fish solubles and the riboflavin.

A COMPARISON OF COTTONSEED AND SOYBEAN MEALS IN DIETS FOR LAYING CHICKENS. By Burt W. Heywang, Bureau of Animal Industry, Glendale, Ariz. *Poultry Science*, Sept. 1947.

In five experiments, the diets fed to laying White Leghorn pullets contained only enough fish meal or meat scraps to furnish less than 3 percent of animal protein. They also contained 15 percent cottonseed meal, or 15 percent soybean oil meal; or 7.5 percent cottonseed meal and 7.5 percent soybean oil meal.

Small quantities of ferrous sulphate were included in some of the diets containing cottonseed meal, on the supposition that the iron might tie up gossypol and thus increase the value of the cottonseed meal protein.

Results indicate the two meals were of about equal value. This was measured by egg production, feed consumption, body weight and mortality. In most cases, including ferrous sulphate in the diets resulted in decreased egg production.

Soybean Oil

SOLVENT EFFECTS ON THE PRODUCTS OF SOYBEAN OIL EXTRACTION. By A. C. Beckel, P. A. Belter, and A. K. Smith, Northern Regional Research Laboratory, in *Journal of the American Oil Chemists Society*, Jan. 1948.

Ethanol, isopropanol, isobutanol, ethylene dichloride, trichloroethylene, carbon tetrachloride, and hexane (b.p. range 30° to 60° C.) were used as solvents for the extraction of soybean oil and the comparative effect of the solvent on the color and other properties of the oil, meal, and isolated protein was measured.

Ethanol extraction gave the best results with respect to the color of oil, meal, and protein, and it also served as a debittering agent for the soybean meal.

THE NONDISTILLATION ALCOHOL EXTRACTION PROCESS FOR SOYBEAN OIL. By A. C. Beckel, P. A. Belter and A. K. Smith, in *Journal of the American Oil Chemists' Society*, Jan. 1948.

A new vegetable oil extraction process has been developed, with alcohol as the oil solvent.

The process requires *no distillation* to recover the oil or the solvent characteristics of the alcohol. This has been demonstrated by reuse of the solvent more than 85 times. The theoretical energy requirement of the process is about three-fourths that of the hexane process.

DRYING OF VEGETABLE OILS — SOME COLLOIDAL ASPECTS OF THE PROCESS. By P. Slansky, research depart-

ment, British Paints Ltd. *Paint Manufacture*, May 1947.

The drying of linseed oil, a phenomenon which has been known for 15 centuries or more, is now known to be a much more complicated process than was at first suspected.

In this article the author, a recognized authority on the subject, considers the drying process of vegetable oils as a chemical colloidal reaction comprising two stages: first, oxidation, polymerization and other chemical reactions; and second, the gelation of the oxidized and/or polymerized triglycerides. .

Proteins

AN INFORMATION STUDY ON HOW TO USE ISOLATED PROTEINS IN HARD CANDIES. H. H. Hall and Fred J. Fahs. Bureau of Agricultural and Industrial Chemistry, New Orleans, La. *Manufacturing Confectioner*, Nov. 1947.

Methods have been developed for the incorporation of soybean proteins into representative types of hard candies.

Although it is not possible to incorporate insoluble proteins into plain, clear, hard candies without causing clouding, the appearance is enhanced by placing a clear wrapper over the protein-containing portion of the candy.

The graining characteristics and other quality factors of white sugared mints are not changed by the addition of proteins. However, the results suggest the desirability of using almost white protein products for candy of this type. Formulas are given for experimental hard candies containing 10.73 percent and 7.23 percent protein.

LOW TEMPERATURE HYDROLYSIS OF COMMERCIAL PROTEINS. By Edward J. Bird and Lewis J. Minor, Wayne University, Detroit, Mich. *Food Industries*, Feb. 1948.

The authors state that hydrolysates with improved flavor and higher amino acid content result when commercial protein materials are treated with hydrochloric acid at 167 or 176 degrees F. instead of at the higher temperatures commonly used.

They say solvent extracted soybean oil meal is a valuable protein source. Hydrolysis may make of it an important addition to the protein part of the national diet.

EFFECT OF ELECTROLYTES ON THE FOAMING CAPACITY OF ALPHA SOYBEAN PROTEIN DISPERSIONS. By Joseph M. Perri, Jr., and Fred Hazel, Department of Chemistry and Chemical Engineering, University of Pennsylvania, Philadelphia, Pa. *Journal of Physics and Colloid Chemistry*. May 1947.

The authors report on their investigation into the effects of electrolytes and of hydrogen-ion concentration on the foaming properties of alpha soybean protein dispersions.

Germination

PROBLEMS OF SOYBEAN GERMINATION. By Charlotte B. Cundiff, Kentucky Agricultural Experiment Station, Lexington, Ky.

Because of the variation in germination tests, the Station was having considerable difficulty in securing results that were satisfactory. Other laboratories were having the same trouble. So additional research was conducted on this problem.

Two methods of germination on both black and yellow varieties of soybeans—soil tests and paper towel tests, were used.

Results indicate that paper towel tests in daylight germinators give a better result than soil tests. Also, black soybeans seemed to give better germination with less tendency to rot or mold than yellow soybeans.

The author suggests that less variation in tests by the various laboratories would be realized if the analysts would make careful studies of the characteristics that determine abnormal sprouts. She believes that much additional information could be obtained by continuing research on this problem of abnormal sprouts in soybean germination.

Tennessee

SOYBEAN VARIETIES IN TENNESSEE. *58th Annual Report* Tennessee Agricultural Experiment Station, Knoxville, Tenn.

Soybeans were grown at four places. The variety Ogden, a development of the Tennessee Station, gave the highest average yield of seed for the four places and was second to Volstate, another Tennessee variety, in yield of hay. The standard Tokio variety also gave a creditable performance.

Such varieties as Tokio, Volstate, and U. T. 296 might be classified as late-maturing; Ogden, Arksoy, Delsoy, and Easycook as mid-season; and Macoupin, C-185, and F.P.I. 84922 as early-maturing varieties. The early and mid-season varieties gave relatively better seed yields on the Cumberland Plateau, at Crossville.

Average Acre Yields of Soybean Seed at Four Stations, 1945

Variety	Bushels
Ogden	24.4
Tokio	24.2
Volstate	24.1
U. T. 296	22.0
Delsoy	19.9
Easycook	19.7
Arksoy	18.2
C-185	17.9
Macoupin	16.5
F.P.I. 84922	16.3

Average Acre Yields of Soybean Hay at Four Stations, 1945

Variety	Tons
Volstate	2.78
Ogden	2.68
Tokio	2.53
U. T. 296	2.47
Delsoy	2.34
Arksoy	2.31
Easycook	2.27
C-185	2.13
Macoupin	1.92
F. P. I. 84922	1.90

Soybean Lipoxidase

A NOTE ON THE PREPARATION OF CRYSTALLINE SOYBEAN LIPOXIDASE. By Hugo Theorell, Ralph T. Holman and Ake Akeson, Biokemiska Avdelningen, Medicinska Nobelinstitutet, Stockholm, Sweden. *Archives of Biochemistry*, July 1947.

Lipoxidase, an enzyme capable of promoting the oxidation of linoleic acid and other unsaturated fatty acids by atmos-

pheric oxygen, has been isolated in pure form from soybeans.

The method of separation is described briefly.

The details of the method of preparation of crystalline lipoxidase and a discussion of its properties will be presented in detail at a later date in the *Acta Chemica Scandinavica.*

ACTIVATION OF SOYBEAN LIPOXIDASE. By Marian W. Kies, Bureau of Agricultural and Industrial Chemistry, U. S. Department of Agriculture, Albany, Calif. *Journal of Biological Chemistry.* Sept. 1947.

A crystalline polypeptide which enhances the oxidation of carotene-ethyl linoleate by lipoxidase has been isolated from soybeans.

The substances which constitute this "activator" of soybean lipoxidase may produce under favorable circumstances and with purified enzyme a very great acceleration of the reaction, often amounting to 300 percent.

Diseases

OBSERVATIONS ON BUD BLIGHT OF SOYBEANS IN ONTARIO. By A. A. Hildebrand and L. W. Koch, Dominion Laboratory of Plant Pathology, Harrow, Ontario.

Bud blight was first detected in Ontario early in July 1944 in the Harrow laboratory soybean experimental plots. Since then it has been found in so many widely-scattered commercial fields that its occurrence in Ontario, as in the more important soybean-growing areas in the U. S. is considered to be co-extensive with the cultivation of this crop.

FOUR PRINCIPAL DISEASES OF FIELD SOYBEANS IN NEW JERSEY. By C. M. Hænseler. *New Jersey Agriculture,* May-June 1947. Agricultural Experiment Station, New Brunswick, N. J.

Four diseases described are mosaic, downy mildew, pod and stem blight and purple seed disease. Author says these diseases warrant careful consideration if the crop should continue to increase in importance in New Jersey.

Economics

AGRICULTURAL ECONOMICS SERIES. By Henry F. White, head of the division of social sciences, John Brown University. John Brown University Press, Siloam Springs, Ark.

The series consists of four books, which give an excellent appraisal of agricultural and marketing problems and policies during recent years. They are offered to the reading public for general use and to the professorship for use as textbooks.

The books include: *Marketing Problems and Policies, Agricultural Problems and Policies, The Farmer and Economic Progress,* and *A Syllabus to Accompany the Farmer and Economic Progress.* The third book is a complete edition consisting of the contents of the first two. The *Syllabus* is a splendid companion book for the general reader, as well as for students and teachers who wish a guide for study of the other three books in the series.

Breeding

EARLY GENERATION TESTING IN SOYBEANS. By Martin G. Weiss, C. R. Weber and R. R. Kalton, Iowa Experiment Station, Ames. *American Society of Agronomy,* Sept. 1947.

The studies reported in the paper constitute an attempt to obtain fundamental information on soybean breeding methods during the progress of a practical plant breeding program.

Commodity Buying

REPORT OF THE ADMINISTRATOR OF THE COMMODITY EXCHANGE AUTHORITY. U. S. Department of Agriculture, Commodity Exchange Authority. 1947.

Reports the activities of the Authority for 1947 and the volume of commodities traded in the various markets.

Processing

SOYBEAN PROCESSING INDUSTRY. By William E. Stiegelmeier. Industrial research, Northern Trust Co., Chicago, in *Bulletin of Robert Morris Associates,* Dec. 1947.

A birds-eye-view of the industry written for the banker.

RESEARCH PROGRAM

The Fats and Oils Branch is working up details of a research program for soybeans to be carried out with Agricultural Research and Marketing Act funds, reports Porter M. Hedge.

The program should be ready some time this month.

GRITS and FLAKES...

FROM THE WORLD OF SOY

Barnard & Leas Mfg. Co., Inc., manufacturer of milling machinery for over 90 years, has transferred all its operations from Moline, Ill., to its new plant at Cedar Rapids, Iowa, according to Geo. T. Ronk, president of the company.

* * * *

Charles W. Crowe, Evanston, Ill., recently elected to the board of directors of Central Soya Co., Inc., Ft. Wayne, Ind., became assistant to President R. H. Fletcher March 1. Dr. Crowe, who discontinued a practice in dentistry to assume his new position, was one of Central Soya's original stockholders.

* * * *

The *1947-1948 Year Book* of the National Soybean Processors Association is off the press. The book contains the trading rules governing purchase and sale of soybean oil and oil meal, methods of analysis of the American Oil Chemists Society, a list of the members, officers and directors and other information about the Association. It may be bought from the Association at 3818 Board of Trade Bldg., Chicago.

* * * *

Election of Samuel Mairs, chairman of the board of directors of Archer-Daniels-Midland Co., Minneapolis, as a director of First Bank Stock Corp., also of Minneapolis, has been announced.

* * * *

Illinois Farm Acreage Census for 1946 reports soybeans for beans, hay and soybeans plowed under by counties. The report is released by A. J. Surratt, agricultural statistician, Springfield, Ill.

* * * *

A new storage elevator with 820,000-bushel capacity is now in operation at Iowa Falls, Iowa, by Ralston-Purina Co. The new structure is 296 feet long and 177½ feet high. Iowa Falls is one of five Purina processing points.

* * * *

A. F. Rolf has retired after 25 years as assistant secretary of Allis-Chalmers Mfg. Co. He was associated with the firm's New York office for almost 45 years.

* * * *

A page of soybean recipes under the title of "Soybeans for Good Meals," appeared in a recent issue of OHIO FARMER.

* * * *

G. F. Byrne family, Moorland, Iowa, recently received the W. G. Skelly award for achievement in agriculture. The Byrnes follow a well-balanced system of agriculture including 35 acres in soybeans.

* * * *

"Elevating and Conveying Equipment for Soybeans," was one of the subjects discussed at the February sales conference of Riechman-Crosby Co., Memphis, Tenn. The paper was by James A. Farnham and C. W. Hoover, Jr., salesmen for the firm. Richard A. Alcott, vice president, presided.

* * * *

John L. Weihing, who has been doing soybean work for the department of agronomy, University of Nebraska and the U. S. Regional Soybean Laboratory, accepted an appointment as graduate assistant in plant pathology at the University February 1.

* * * *

The 100th anniversary of the founding of the Chicago Board of Trade, world's largest grain exchange, will be observed in April, with an anniversary banquet at the Stevens Hotel, Chicago, April 3.

* * * *

Roy N. Ellison, Abilene, Kans., has been appointed Kansas representative for the Burrows Equipment Co., Evanston, Ill. He was a salesman for Ralston Purina Co. in Nebraska and Kansas for a number of years. His headquarters will be at Abilene.

* * * *

Phillip F. Cleaver, president of the Rose City Cotton Oil Mill, North Little Rock, Ark., died recently in a Little Rock hospital. He was also president of the National Cottonseed Crushers Association.

* * * *

Richard F. Uhlmann, president of the Chicago Board of Trade, was a recent witness before the Senate agriculture and forestry committee opposing a bill designed to give the government power to regulate margins in grain futures speculative transactions.

* * * *

"Effects of Deodorization on the Stability of Vegetable Oils," "A Technique for Testing the Reversion Properties of Hydrogenated Soybean Oil Shortenings," "Flavor Problem of

HEADS PROCESSOR CROP PROGRAM

J. Ward Calland has been selected by the National Soybean Processors Association to direct the permanent soybean crop improvement program of the Association. Mr. Calland assumed his new duties March 1.

For the past 4 years, Mr. Calland has been director of agronomy for the Central Soya Co. His service with that firm dates back to 1933 when Ward joined Central Sugar Co., an affiliate, at its inception in 1933.

Mr. Calland is a graduate of Ohio State University and at present is a member of

WARD CALLAND

the board of trustees of Purdue University.

In releasing him for this important Association project, D. W. McMillen, chairman of the board of Central Soya Co., said: "We feel that no one more appropriate to the new national assignment could have been chosen than Ward Calland. In his new position he will be able to extend to wider fields the splendid work he has been doing and will benefit the industry and the farmers we serve."

Last spring the Soybean Crop Improvement Council of the Association published an informational booklet on *Soybean Farming.* This publication was enthusiastically received by soybean growers, agronomists, county agents, vocational agricultural teachers and others interested in the soybean industry. About 150,000 of the booklets already have been distributed.

The encouraging response to this initial effort was a primary factor in the processors' decision to establish a permanent crop improvement program and to obtain the full time services of Mr. Calland to direct and greatly expand that activity.

—s b d—

FLOUR PURCHASE

Purchases of 100,000 long tons of soy flour now have been completed by the U. S. Army for shipment abroad in the period

Soybean Oil," and "A Comparison of Wesson Loss and Cup Refining Loss Analyses of Crude Cottonseed and Soybean Oils," were among articles in the February issue of *Journal of American Oil Chemists Society.*

* * * *

A heart attack recently was fatal to Mrs. Hugh Humphreys, mother of Herbert Humphreys, president of the Humko Co., Memphis, Tenn., refiners of cottonseed and soybean oils.

* * * *

Twenty-three states, England, Sweden and Italy were represented at the National Farm Institute held in Des Moines, Iowa, February 13-14. Forty-seven percent of attendants were farmers.

* * * *

Charles H. Hubbell has joined the organization of Lyman Peck, feed consultant, in Chicago. He has been employed by the Des Moines Oat Products Co.

* * * *

Report of the North Iowa Cooperative Processing Association, Manly, Iowa, is a highly attractive 12-page folder. Booklet is illustrated with pictures taken around the plant. Operations for the year ending last August 31 are covered.

* * * *

Otis H. Tuttle, Norway, Iowa, was a recent contestant on the R. F. D. America radio program on Mutual network. Soybeans are among the crops raised on Tuttle's 496-acre farm.

* * * *

Earl H. Wildy, North Mississippi County, Ark., soybean yield contest winner this year, was one of the contestants on R. F. D. America radio program February 26. Wildy was Arkansas' "Plant to Prosper" winner in 1944. He has a B.A. from the University of Arkansas and his hobby is flying.

* * * *

January issue of *Fortune* contained an elaborate story of Ralston Purina Co., with many color illustrations. These include pictures of Wm. H. Danforth, founder of the organization and chairman of the board; and Donald Danforth, president.

* * * *

Expansion of plant facilities of Ralston Purina Co. at Wilmington, Del., has been completed. Storage facilities have been increased from 60,000 to 240,000 bushels, and milling capacity by 50 percent.

* * * *

Max Kernan, Ohio territory manager for McMillen Feed Mills, Fort Wayne, Ind., has been named assistant district manager of the Kentucky district. Don Long, assistant to Mr. Kernan, will take over the post of Ohio territory manager.

* * * *

"Herb" Borgelt, Havana, Ill., nationally known turkey raiser, has been appointed turkey specialist for the feed and soy division of Pillsbury Mills, Inc., Clinton, Iowa. Mr. Borgelt is president of the Illinois Turkey Growers Association and served as first president of the Illinois Poultry Cooperative.

* * * *

The following men were recently elected to membership in the Chicago Board of Trade: Clarence C. Fivian, Continental Grain Co., Chicago; Carl C. Barrington, Archer-Daniels-Midland Co., Minneapolis; Harry Shere, Van Dusen Harrington Co., Minneapolis; Arthur L. Peydick, Andrew Stewart Messick Co., Chicago; and Albert M. Andreas, National Vegetable Oil Co., Minneapolis.

* * * *

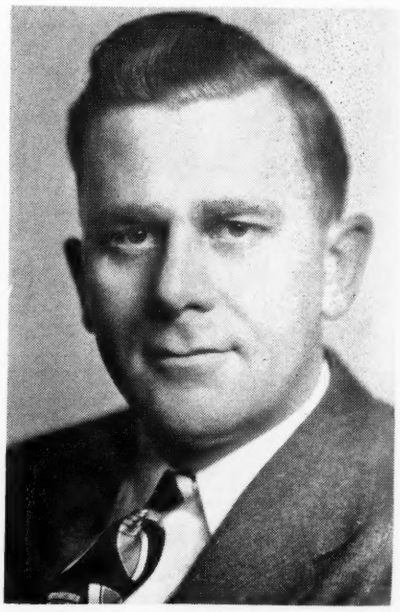
The Illinois Commerce Commission ordered all rail carriers operating intrastate in Illinois to publish on not less than 1 day's notice, on or before February 1, rates on soybeans in carload lots, for single line application, on the same basis as currently maintained on grain.

January through next June. This protein food product is being used for civilian feeding purposes.

Suppliers of the current order, completed January 7, are Archer-Daniels-Midland Co., Central Soya Co., Inc., The Glidden Co., Spencer Kellogg and Sons, Inc., and A. E. Staley Manufacturing Co., all with large mills in the heavy soybean producing areas of the Midwest. Shellabarger Soybean Mills, Decatur, Ill., also is currently shipping on a previous contract.

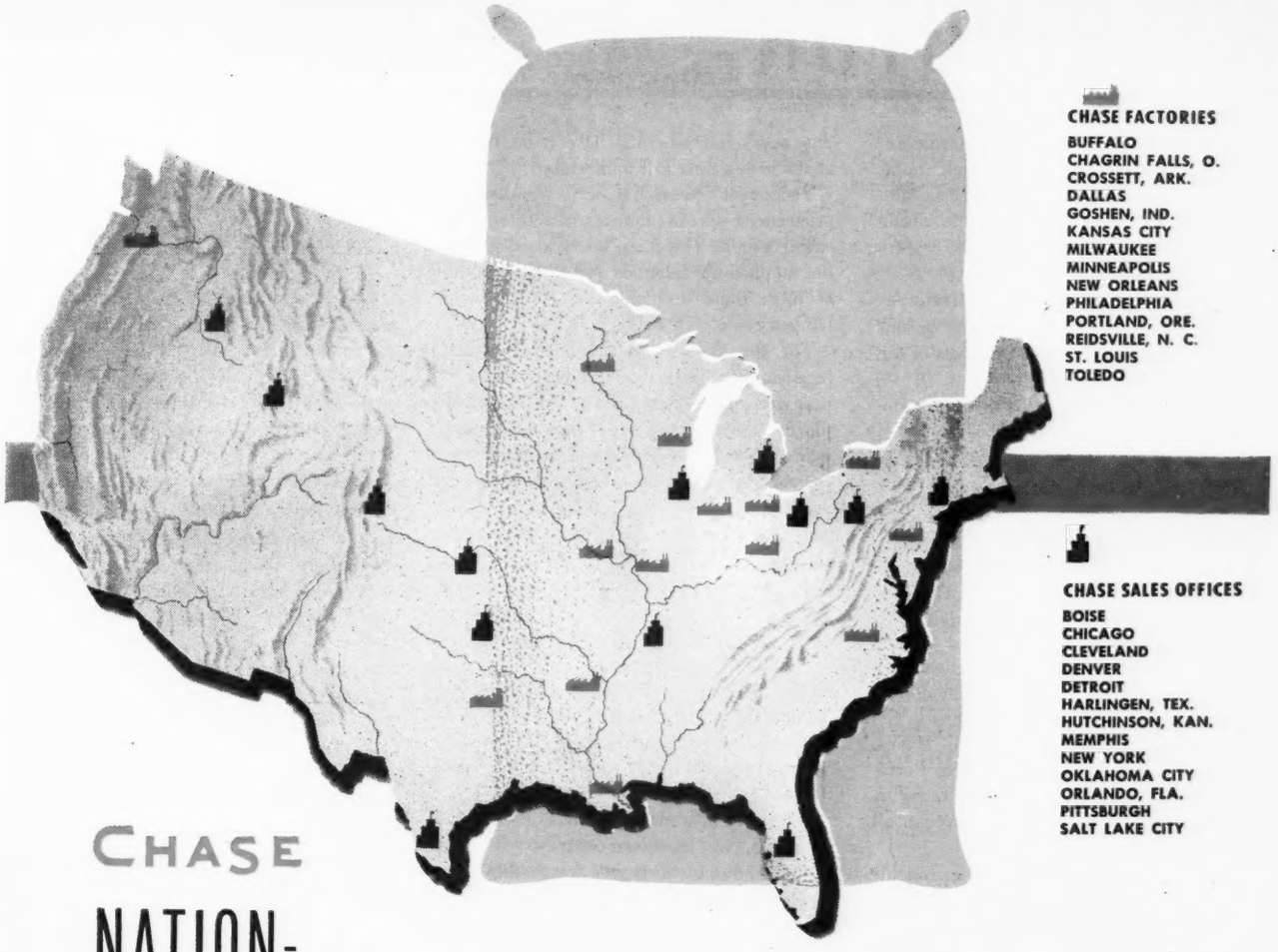
—s b d—

GLIDDEN APPOINTMENT



FORD M. FERGUSON

Appointment of Ford M. Ferguson to the position of executive assistant in the soya products division of the Glidden Co. was announced by Ralph G. Golseth, vice president in charge of the division. Mr. Ferguson comes to Glidden from Cargill Inc. where he has served in an administrative capacity for the past 3 years. Prior to that, he was manager of Cargill's Chicago office. Ferguson's duties with Glidden will entail important responsibilities in the merchandising of Glidden's Alpha Protein, Prosein and numerous other soya products.



CHASE FACTORIES

BUFFALO
CHAGRIN FALLS, O.
CROSSETT, ARK.
DALLAS
GOSHEN, IND.
KANSAS CITY
MILWAUKEE
MINNEAPOLIS
NEW ORLEANS
PHILADELPHIA
PORTLAND, ORE.
REIDSVILLE, N. C.
ST. LOUIS
TOLEDO

CHASE SALES OFFICES

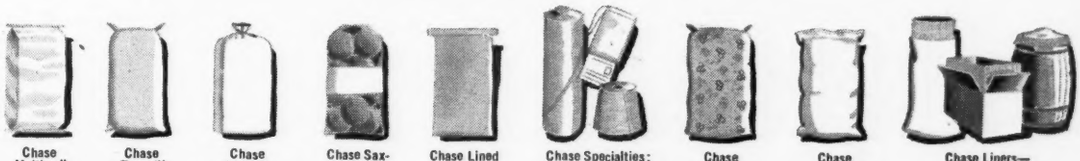
BOISE
CHICAGO
CLEVELAND
DENVER
DETROIT
HARLINGEN, TEX.
HUTCHINSON, KAN.
MEMPHIS
NEW YORK
OKLAHOMA CITY
ORLANDO, FLA.
PITTSBURGH
SALT LAKE CITY

CHASE NATION-WIDE BAG SERVICE

ONE HUNDRED YEARS is a mighty long time. It also can be a rather uneventful span . . . nothing of much importance is recorded between 847 and 947 A.D. It can also be a century of great events and progress—1847-1947, for example. And this is the period of our experience in manufacturing bags of all kinds for American industry and agriculture.

This experience is a very important part of the background that your technically trained Chase Salesman brings to bear on your packing problems. Whatever your packing needs may be, Chase can provide an efficient and economical container for your products. It will pay you to check with your nearby Chase Salesman.

Chase factories and sales offices are strategically located to quickly serve your specific requirements.



Chase Multiwall Paper Bags | Chase Topmill Burlap Bags | Chase Li ipack Paper Bags | Chase Saxolin Open Mesh Bags | Chase Lined and Combined Bags | Chase Specialties: Mailing Bags, Spiral Tubing, Twines | Chase Pretty Print Cotton Bags | Chase Heavy Duty Cotton Bags | Chase Liners—Crinkled and Pleated

CHASE SINCE 1847 BAGS

for Better Bags...Better Buy Chase

CHASE BAG CO.

GENERAL SALES OFFICES, 309 WEST JACKSON BLVD., CHICAGO 6, ILL.

BOISE • DALLAS • TOLEDO • DENVER • DETROIT • MEMPHIS • BUFFALO • ST. LOUIS • NEW YORK • CLEVELAND • MILWAUKEE
PITTSBURGH • KANSAS CITY • MINNEAPOLIS • GOSHEN, IND. • PHILADELPHIA • NEW ORLEANS • ORLANDO, FLA. • SALT LAKE CITY
OKLAHOMA CITY • PORTLAND, ORE. • REIDSVILLE, N. C. • HARLINGEN, TEXAS • CHAGRIN FALLS, O. • HUTCHINSON, KAN. • CROSSETT, ARK.

WASHINGTON Digest

More Protein Is Available Because of sharply reduced livestock numbers, feed experts here estimate that the supply of protein meals is better now than in any of the last 5 years —in terms of feed per animal unit.

This easing of the feed supply may make it possible for USDA, later on, to permit some further exports of protein meals of the low-grade types.

The 50,000 tons of soybean oil meal mentioned here last fall as a possible allocation to the Army for use as food in Japan has now been authorized for Army pickup. This is the total Army has requested to date.

Protein meal allocations for the balance of this fiscal year are to remain on an "emergency" basis, unless USDA policy is changed. There is no indication now that this will happen.

Four "supplemental" export allocations of soybeans and soybean oil were made last month: 24,000 pounds of seed beans to the United Kingdom for shipment to Myasaland; 5,000 pounds of soybean oil to Portugal; 500,000 pounds of soybean oil to Switzerland; and 100,000 pounds of soybean oil to Peru.

An additional export allocation of roughly 50,000 tons of protein concentrates—about the amount called for in the first 3 months of the Marshall plan—is being considered by U. S. Department of Agriculture.

The actual volume of exports will have to be approved by Secretary Anderson. But more shipments are now virtually certain in view of the improved supply situation.

Whither Prices? Official Washington is pretty well convinced that most of the "water" has been squeezed out of farm prices for the time being. It looks for markets to level off possibly a little higher than early March, but below the winter peaks.

The weather this season and the size of this year's harvests will have a lot to say about prices next fall and winter.

The payoff question now is whether the price break spreads into manufactured consumer goods. The price boost in steel, and the stepped-up demands for a third round of wage increases don't indicate this will happen soon.

For the short term the dominant view here is this: The peak in farm prices is past, but most of the adjustment has taken place. Prices will recover some. A common guess is $3.60 a bushel soybeans. There may be another inflationary spurt this spring and summer. But it won't get out of hand. It won't again be sparked by farm prices—unless crops are short.

It's significant that the commodity men here, without exception, look for prices in their own particular lines to improve some before the next harvests.

For the longer term, the level of consumer income is all-important. The farm price level is now in line with national disposable income, plus exports, for the first time since OPA.

The normal prewar relationship has been resumed, at least temporarily. It's one reason the economists give for thinking that the worst of the inflationary period is over.

Price Support U. S. Department of Agriculture is reported on good authority to be planning to end government guaranteed price floors on all Steagall commodities, including soybeans, December 31 unless Congress extends price support legislation.

Steagall commodities are those for which the secretary of agriculture asked war production increases by official proclamation. They include hogs, eggs, chickens, turkeys, milk, butter fat, dry peas, dry beans, common potatoes, sweet potatoes, soybeans, peanuts and flaxseed.

By PORTER M. HEDGE

Washington Correspondent for The Soybean Digest

For storable crops such as soybeans, 90 percent of parity loan would be offered growers through December, then the loan would be closed, and there would be no further price support operating the rest of the marketing season. Non-storage commodities would have 90 percent of parity floors guaranteed to the end of the year, but no support beyond that, according to present plans.

Assuming that the parity index drops no more than a few points in the next 6 months, soybeans would have a support of around $2.10 a bushel.

Congress has given no clear-cut steers as to what it may do with support prices after this year—except to lower the guaranteed rates. Setting support prices of about 75 percent of a revised and "modernized" parity is proposed in the new Senate long-range farm bill. Senator Taft of Ohio has recommended lower price guarantees. There is strong sentiment for this among House farm leaders.

Research Findings Recent findings in soybean research by the Department of Agriculture are reported by the scientific bureaus of the Agricultural Research Administration. Here are some of the highlights:

Diseases: Brown stem rot, unknown until the fall of 1944, has become the most serious and destructive of the soybean diseases.

Studies conducted in the Cornbelt indicate its sudden appearance is the result of wartime farming practices, such as alternating corn with soybeans with no intervening pasture or grain crops.

The Bureau of Plant Industry, Soils and

Engineering feels that brown stem rot will become less of a problem when producers return to good crop rotations.

The disease usually shows up in fields that were cropped to soybeans oftener than once in 3 years. On the healthy fields a 4-year rotation of corn, soybeans, wheat or oats, and clover had been practiced.

The Bureau thinks that the important point in the rotation is to allow at least 3 years to elapse between soybean crops. The kinds of intervening crops appear to be of small importance.

Farm Storage: Sixty thousand bushels of soybeans from the 1943 and 1944 crops were put in experimental storage of various types and sizes at Urbana, Ill. Here are the results:

In 34 months of storage in farm-type bins, soybeans with an initial moisture content of 8 to 12 percent showed no loss of grade and an average increase in moisture content of 0.8 percent.

At 8 to 9 percent moisture when put in storage, there was little loss in germination after 28 months. But when soybeans were put into storage with 12 percent moisture, germination decreased sufficiently within 10 to 12 months to make them unsuitable for seed purposes.

No appreciable change in oil content was noted, whether the beans were stored with 8 or 12 percent moisture.

At moistures between 13 and 14 percent, soybeans for commercial sale can usually be stored through late fall and winter with little deterioration. But if they are to be held for more than a year, 12 percent moisture is about the safe limit for storage.

Seed stocks with up to 12 percent moisture can be stored in weather tight bins in cool climates for 6 to 12 months with little loss in germination. But if they are to be held for longer than a year, or for shorter periods in temperatures above 75 degrees F., the initial moisture content should be around 9 percent.

Studies on mechanical drying show that heated air with a relative humidity below 30 to 40 percent can't be blown through high-moisture soybeans for any length of time without some of the beans becoming too dry.

This indicates it's desirable to have thin layers of beans to permit more uniform drying. If the layers are more than three or four feet thick, better results are obtained if the heated air isn't too dry.

In periods of market gluts or car shortages, an emergency storage pile is satisfactory for 10 to 60 days. In the Urbana tests, a pile with 125 bushels of soybeans containing an average moisture content of 8.6 percent was put on a water-resistant paper-covered earth fill and covered with the same type of paper.

Trenches were dug to carry off surface water. In 82 days of storage the average moisture content increased to 9 percent. There was no spoilage from weather. Less than 20 pounds (damaged by rats) was lost. Total precipitation during the storage period was 6.4 inches, 1½ inches of this coming in a 24-hour period.

Food: A way of expanding the use of vegetable varieties of soybeans for food is suggested by studies on dehydrated green soys.

Green soybeans appear to be remarkably well adapted to dehydration. Tests show that the dehydrated beans, when prepared for table use, are similar to those prepared fresh. They are far superior to the canned product, since they contain most of the characteristics of the garden-fresh article. (See article on page 20 of this issue.)

New uses: Scientists at the Northern Regional Research Laboratory have developed soybean protein adhesives equal or superior to casein adhesives in the manufacture of shotgun shell casings.

A big manufacturing firm appealed to the laboratory in 1946 to help it find a satisfactory substitute for casein adhesive. At that time the supply of casein was short and the price high.

Several formulations of soybean protein adhesive were found. Shooting tests showed the shells made with soybean adhesive to be equal or superior to those previously manufactured.

Fats, Oils Imports

The U. S. will remain a big net importer of fats and oils during the present calendar year. This is shown by tentative export and import allocations just approved by USDA.

The allocations show probable exports of 670.2 million pounds of fats and oils during the year, against probable imports of 928 million pounds. The January-March export allocation totals 87 million pounds.

These allocations, recommended by the International Emergency Food Committee, are preliminary, and subject to revision. They cover both commercial and government procurement. Any oilseeds exported, and any fats and oils shipped this year against the 1947 allocation, will be counted in this year's quota.

Here is the breakdown of the 1948 allocation in millions of pounds, oil equivalent:

Liquid edible oils 275.6; lard 240.1; copra or coconut oil 22; hard and semi-hard fats and oils 61.7; margarine 0.9; linseed oil 8.2; soap 22; unspecified (contingent on U. S. importing 72.8 million pounds of olive oil) 39.7.

Margarine Tax Bills

Strategy of the dairy lobby on margarine tax repeal is to delay House action of any kind until summer, and if possible until about the time Congress adjourns.

It's conceded that if a margarine tax repeal bill were reported favorably by the House agriculture committee it could pass the House, and win in the Senate easily.

House leaders say flatly that a repealer bill won't pass during this session of Congress, but the margin for passage is the closest in the long history of repeal efforts. The latest nose count in the House agriculture committee indicates that a switch of three GOP votes would bring out a favorable report on a repeal bill.

Congressman Mitchell of Indiana has introduced a bill to permit use of margarine by the armed forces. Riders attached to appropriations bills have prohibited the Army serving margarine except on request by service personnel.

Market Street

We invite the readers of THE SOYBEAN DIGEST to use "MARKET STREET" for their classified advertising. If you have processing machinery, laboratory equipment, soybean seed, or other items of interest to the industry, advertise them here.

Rate: 5c per word per issue.
Minimum insertion $1.00.

SITUATIONS VACANT — Two fully qualified and experienced chemical engineers required, each to run one shift of a 150 tons a day Allis-Chalmers solvent extraction plant on soya beans in England, commencing first September 1948. Previous experience in solvent plant essential. Excellent salary. Write full details, to FS, care Soybean Digest, Hudson, Iowa.

AODA—Vegetable soybean seed. Choicest quality seed stock. Soybean Johnson, 1244 S. 4th St., Louisville 3, Ky.

SEED DIRECTORY

A charge of $1.00 will be made to subscribers for listing in the April issue. Quantity for sale and variety are included.

ARKANSAS

Burdette — Burdette Plantation, 2,000 bu. certified improved Arksoy and certified Burdette 19.

Scott — Robert L. Dortch Seed Farms, 1,500 bu. certified Dortchsoy 2; 1,500 bu. certified Dortchsoy 7; 500 bu. certified Dortchsoy 31.

ILLINOIS

Laura — F. M. Oakes, 800 bu. uncertified Lincoln.

Ursa — Frank W. Lewis, 2,000 bu. certified Lincoln.

Woodstock — Pell-Bari Farms, Inc., 305 Clay St., 45,000 bu. uncertified Lincoln type.

INDIANA

De Matte — Carl L. Frittz, 1,000 bu. certified Lincoln.

Windfall — Mitchell Farms, 1,000 bu. certified Earlyana; 5,000 bu. certified Lincoln.

KANSAS

Burlington — James L. Cochran, Rt. 4, 350 bu. Chief, eligible to be certified.

KENTUCKY

Louisville — E. F. (Soybean) Johnson, 1244 S. 4th St., Aoda, 99.9% pure, 97% germination.

MINNESOTA

Sacred Heart — Peter Homme, 500 bu. uncertified Ottawa Mandarin.

OHIO

Troy — Bert Favorite & Sons, 1,500 bu. certified Lincoln.

—sbd—

Farming plans in Rumania for the coming year include reduction in corn acreage and increase in oil-bearing plants such as sunflowers and soybeans, a report to *Northwestern Miller* indicates.

In The MARKETS

MARKETS MOVE UPWARD AFTER SHARP DECLINES

Soybeans and soy products all reached the end of a 4-week period of declining prices in mid-February. And all regained some lost ground during the last 2 weeks of the month.

All followed on the tail of the cascading grain market early in February—the heaviest break in grain since 1917, according to Richard Meinke in *Chicago Journal of Commerce.*

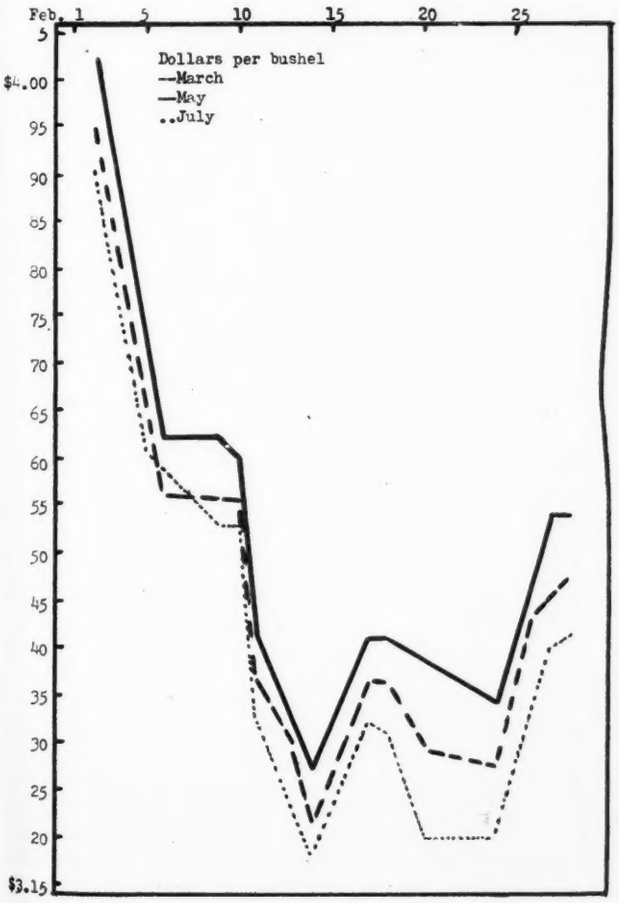
Soybeans suffered the sharpest declines, falling the daily limit between Feb. 2 and 6, and again on Feb. 10. March futures for No. 2 soybeans dropped $1.14 from the high of $4.41 Jan. 17 to the low point of $3.18 Feb. 14. They staged a recovery the third week in February to be followed by a short decline early in the last week of the month. This was checked, however, and March futures advanced the limit the last 2 days of the month. By February 28 March No. 2 soybeans were quoted at $3.54 on the Chicago Board of Trade, a gain of 40c from the low point.

Trading in spot soybeans was very light, with the large processors largely out of the market.

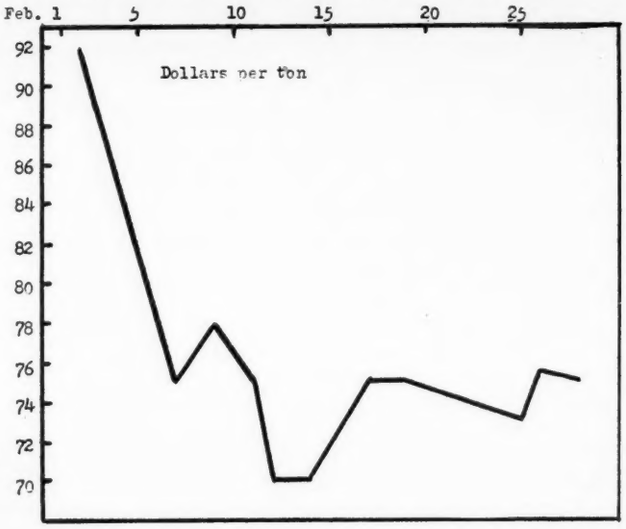
Soybean oil meal followed about the same pattern as soybeans. Bulk soybean oil meal, basis Decatur, fell from $103 Jan. 19 to $70 Feb. 12. There was a $21 decline the first week in February, followed by another $5 decline the second week. The market staged a comeback the third week to be followed by another short decline the latter part of the month. Meal was being quoted at $75, $5 above the month's low, Feb. 28.

A factor in strengthening the meal market was Army purchase of 14,500 tons of soybean oil meal for shipment abroad. But on

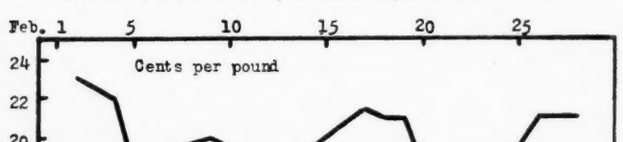
NO. 2 SOYBEANS, CHICAGO FUTURES



BULK SOYBEAN OIL MEAL, DECATUR BASIS



CRUDE SOYBEAN OIL, TANKERS, F.O.B. DECATUR



the whole trading was quiet with demand for immediate shipment far from aggressive. Production held up well.

Soybean oil also continued a decline begun in mid-January though it was not so pronounced and was checked sooner. Crude soybean oil in tankers, f.o.b. Decatur, lost 9½c from the high of $27.50 in mid-January to the low of $18 Feb. 5-6 and again Feb. 11-12. It had regained $3 by the end of the month.

Most of the month the oil market was dull, with demand light and only scattered trading.

MEMPHIS FUTURES CLOSINGS FEB. 28*
SOYBEAN OIL MEAL

	Soybean Oil Meal
March	$79.60-81.60
May	79.60-80.00
July	79.45-80.00
October	75.40-76.25
December	bid 66.00
January	bid 65.00

Sales: 400 tons.

NEW YORK SOYBEAN OIL FUTURES, FEB. 27*

Close: Mar. 23.00N, May 22.00A, July 21.75A, Sept. 20.25A, Oct., Dec. and Jan. 18.75N. No sales.

*From *Chicago Journal of Commerce.*

• SOYBEAN STOCKS. Stocks of soybeans January 1 were 9 percent less than a year ago and the smallest in the 6 years for which data are available, according to the Department of Agriculture. Crushings of soybeans during the October-December quarter were only slightly smaller than last year's record but were about 10 million bushels larger than the average for the 4 previous years.

Stocks of soybeans in all positions on January 1 amounted to 141 million bushels compared with 155 million last year and an average of 162 million the 4 previous years. Farm stocks at 51 million bushels were considerably larger than on January 1 in the past three years. Stocks at terminals and interior mills and ele-

vators were about 70 percent of those of a year earlier while the supply at crushing plants amounted to 49 million bushels or 10 million bushels under those held January 1, 1947.

Disappearance of soybeans during the October-December quarter this season amounted to 45.3 million bushels. This was 5 million bushels less than the same months last season and ½ million less than the same months of the 1945-46 season. The drop in disappearance was due to the small amount fed since crushings for oil were about the same as last year. Because of the high prices only 3.4 million bushels of soybeans were fed the first quarter. This is less than half of that fed in the same quarter last year or the average for the war years. Crushings of soybeans for oil, as reported by the Census Bureau, totaled 41,317,000 bushels the first three months of this season. This is about 400,000 bushels less than were crushed in the same months the previous year but is 3,529,000 bushels more than in the same months of the 1945-46 season. The use of soybeans for flour and grits October through December amounted to 3,355,000 bushels of which 52,000 bushels were used to produce full-fat flour and the remainder low-fat or defatted products. This compares with a total of 4,209,000 milled in the July-September quarter and 1,500,000 bushels milled in the October-December quarter 1946. Exports of soybeans the first quarter of the season totaled 541,000 bushels compared with 1,962,000 bushels the first quarter of the 1946-47 season.

STOCKS OF SOYBEANS, JANUARY 1, 1948, WITH COMPARISONS

Position	Reported by	Jan. 1 1946	Jan. 1 1947	Oct. 1 1947	Jan. 1 1948
		—— Thousand Bushels ——			
On Farms	(1)	43,267	37,374	2,236	50,749
Int. Mills, Elev., & Whses.*	(1)	39,572	36,145	244	28,446
Processing Plants	(2)	46,255	60,021	2,777	48,855
Terminals	(3)	24,423	21,704	68	13,294
TOTAL		†153,917	155,244	5,325	141,344

*All off-farm storages not otherwise designated.
†Includes 400,000 bushels in Commodity Credit Corporation bins.
(1)—Crop Reporting Board
(2)—Bureau of The Census
(3)—Grain Branch, P.M.A.

OFF-FARM* STOCKS OF SOYBEANS, JANUARY 1, 1948 WITH COMPARISONS

State	Oct. 1 1947	Jan. 1 1948	State	Oct. 1 1947	Jan. 1 1948	State	Oct. 1 1947	Jan. 1 1948
	1,000 Bu.			1,000 Bu.			1,000 Bu.	
Ohio	801	8,824	Mo.	60	5,586	Miss.	67	709
Ind.	141	8,576	Va.	64	495	Ark.	86	1,690
Ill.	764	31,894	N. Car.	—	1,292	All other		
Minn.	—	6,553	Ky.	—	2,703	States	684	4,892
Iowa	390	15,209	Tenn.	32	2,172	U. S.	3,089	90,595

*Includes stocks at processing plants, as enumerated by the Bureau of the Census, commercial stock at terminals, reported by the Grain Branch, P.M.A.; and stocks in interior mills, elevators and warehouses, estimated by the Crop Reporting Board.

• SOYBEAN INSPECTIONS. Inspected receipts of soybeans in January were of considerably better quality than those for the preceding month, according to reports to the Department of Agriculture. Eighty-five percent of the January inspections graded No. 2 or better compared with 67 percent in December. Only 15 percent fell in the lower grades compared with 33 percent the preceding month. Eighty-six percent graded No. 2 or better for October-January this season compared with 70 percent last season.

January inspections totaled 8,469 cars compared with 6,311 cars in December. The average for the month of January for the crop years 1941-45 was 5,274 cars. Inspected receipts for October through January this season were 57,895 cars compared with 62,564 cars for the same months last season.

Inspections of soybeans in January included the equivalent of 45 cars inspected as cargo lots and truck receipts equal to about 43 cars.

• U. S. SOYBEAN EXPORTS AT ALL-TIME HIGH. United States soybean exports reached an all-time high in 1947 when 118.5 million pounds (in terms of oil) were shipped, compared with 111.2 million in 1946 and an average of 51.0 million for

1937-39. Actual oil shipments totaled 103.4 million pounds whereas bean exports came to only 1.7 million bushels (15.1 million pounds in terms of oil). European countries received 78.0 million pounds of oil, of which France, Belgium, the Netherlands, Switzerland, and Denmark were sent the largest quantities. North American countries purchased 20.3 million pounds of oil, of which 9 and 8 million pounds went to Cuba and Canada, respectively. Canada received 1.4 million bushels or 77 percent of the total bean exports.

Second only to China (including Manchuria), the United States, in 1947, produced 181.4 million bushels of soybeans, compared with the record crop of 201.3 million of 1946 and the 1935-39 average output of 56.2 million.

• COMMERCIAL SOYBEAN STOCKS. Production and Marketing Administration's commercial grain stock reports for Jan. 27-Feb. 24, in 1,000 bu.

	Jan. 27	Feb. 3	Feb. 10	Feb. 17	Feb. 24
Atlantic Coast	442	380	375	380	390
Gulf Coast					
Northwestern and Upper Lake	1,687	1,603	1,492	1,404	1,260
Lower Lake	4,946	2,965	4,926	4,288	4,733
East Central	2,360	2,242	2,275	2,212	2,113
West Central Southwestern & Western	2,620	2,494	2,317	2,223	2,165
Pacific Coast					
Total for week	12,055	9,684	11,385	10,507	10,661
Total year ago	20,709	19,424	17,494	18,609	17,999

• FACTORY USE SOYBEAN OIL. Factory production of crude soybean oil in December was 139,551,000 lbs. compared with 133,652,000 lbs. in November, reports Bureau of the Census.

Factory production of refined soybean oil in December was 112,683,000 lbs.; in November, 97,345,000 lbs.

Factory consumption of crude soybean oil in December was 123,393,000 lbs.; in November 106,816,000 lbs. Factory consumption of the refined oil in December was 110,066,000 lbs.; in November 119,523,000 lbs.

Factory and warehouse stocks of crude soybean oil Dec. 31 totaled 77,491,000 lbs.; Nov. 30 total 84,239,000 lbs. Stocks of the refined oil Dec. 31 totaled 64,161,000 lbs.; Nov. 30 total 59,667,000 lbs.

• SOYBEAN GLUE IN PLYWOOD. Soybean glue consumed by the softwood plywood industry in December totaled 1,909,000 lbs., reports Bureau of the Census. This compares with 1,919,000 lbs. in November and 2,089,000 lbs. in December 1946.

Other glue consumed by the plywood industry in December in pounds: casein 410,000; phenolic resin 3,609,000; other 295,000. Total glue consumption for the month was 6,223,000 lbs., 1,000 lbs. greater than the month previous.

Soybean glue stocks totaled 1,426,000 lbs. December 31, compared with 1,709,000 lbs. a year earlier. Total stocks of all glue Dec. 31 were 3,974,000 lbs.

• COMMODITY CORPORATION LOANS. Commodity Corporation loans on soybeans under the 1947-crop program made prior to Dec. 31, as reported by the U. S. Department of Agriculture were 2,903,955 bu. Total amount of loans was $5,956,503.

Loans on No. 2 or better at 14% moisture average $2.04 per bu. for green and yellow beans and $1.84 for brown, black and mixed beans. Loans were available through Jan. 31, to mature April 30, or earlier on demand. Purchase agreements completed by Jan. 31, provide for delivery in May.

• STANDARD SHORTENING SHIPMENTS. Reported by members of Institute of Shortening and Edible Oils, Inc., in pounds.

February 7	4,923,388
February 14	3,347,386
February 21	2,617,177
February 28	2,843,345